About Children

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ABOUT CHILDREN:

SIX LECTURES

GIVEN TO THE NURSES IN THE TRAINING SCHOOL
OF THE CLEVELAND GENERAL HOSPITAL
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BY

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TO ALL WHO CARE FOR CHILDREN, OR LABOR
FOR THEIR WELFARE, THIS BOOK
IS DEDICATED.

PREFACE.

Having, by request, delivered before the nurses in the Training School of the Cleveland General Hospital a few lectures "About Children," it was thought that the same if printed might be useful to other nurses, to intelligent parents, even to medical students and practitioners.

The book lays no claim to being a complete treatise.

The lectures may be criticised as more suitable for medical students than for nurses; but it has seemed to me that some small degree of medical knowledge, as here given, will enable nurses better to observe, and better to understand *why* they are directed to do thus or so, and therefore to act more intelligently. The observing powers of the nurse stimulated and her intelligence enlisted, she will pursue her duties with greater enthusiasm and success than when blindly attempting to follow instructions in which she sees no philosophy.

The arrangement of the subjects appears somewhat peculiar; but such an arrangement permits the introduction of the greatest number of topics without repetition; while by means of the index everything bearing upon a given subject can be readily found and read consecutively.

The medical reader who knows the thousand and one interruptions, annoyances, anxieties and irregularities incident to the slavery of active practice will, I trust, without my asking, make due allowance for the imperfections of the work. Still, I hope to have been of some use to the children and those who have the care of them.

S. W. KELLEY.

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LECTURE I.

INTRODUCTORY REMARKS. — A GLANCE AT THE LITERATURE OF THE SUBJECT.—CHILDREN'S HOSPITALS.—PECULIARITIES OF THE ANATOMY IN INFANCY AND CHILDHOOD.

I CONFESS to feeling an unusual embarrassment as I face my audience this afternoon. Part of this feeling arises, perhaps, from being unaccustomed to an audience composed entirely of the fairer and more fastidious sex. There is another reason. With a class of medical students, I am aware of the preliminary knowledge of my hearers. I know exactly how much they know, or should know, of the medical and collateral sciences; but with a class of nurses I may not gauge precisely the amount of knowledge possessed of anatomy, physiology, chemistry and natural philosophy, not to mention the natural history of disease and the action of agents for their cure, besides the technical language used in these and allied branches of learning. Moreover, I find myself at a loss to select from the great mass of information now in the possession of the profession concerning children and their diseases such topics and such phases of topics as shall be most useful to you.

When I was asked to give you a half dozen lectures "About Children," I at once said to myself,

"Bare statements of facts, without the reasonable basis upon which they are founded, are easily forgotten; and yet it is impossible in so short a course to give those young ladies a complete exposition of any one branch of pediatrics—of the anatomy—even of the peculiarities of the anatomy of a child—or of the difference between its physiology and that of its parents'. Fully to explain the 'why and wherefore' of all the directions useful in the nursing of children would involve not only the branches mentioned, but a discussion of the causes, pathology, symptoms, course, duration, diagnosis, prognosis, complications, sequelæ and treatment, medical and surgical, of the many diseases to which children are liable. The brief time allowed would not admit this. I am not going to bore those nurses with a lot of diet tables and recipes for concocting slops, soups and paps, nor with arbitrary rules for bathing, nor with specific directions how many clothes and of what denominations should be put upon the child; and that it ought to have always pure air to breathe, etc., etc., things which every well-bred young woman knows, or acquires practically under the guidance of the superintendent, before leaving this institution."

"No!" said I. "But I will endeavor to give them such an insight into the nature of the child; I will so acquaint them with its powers and functions in health, and instruct them upon the signs of disease; I will so direct their observation, quicken their sympathies and awaken their interest that they will look with new eyes upon children and be glad of every opportunity to study

those little patients; and will be able intelligently to aid the doctor in his services for them."

I have mentioned a great mass of information that has accumulated concerning children and their diseases. The ancient writers and those later, from Hippocrates down, contain facts and comments upon children. By and by there are separate chapters, essays, treatises, works of reference, monographs. Let us glance for a moment at a few books pulled down from my shelves, to give you an idea of the **pediatric literature** of the past century. Do not suppose that they are all that have been written — they are only a portion. Here is a "Treatise on the Diseases of Children and Management of Infants from the Birth," by Michael Underwood, M. D., Licentiate in Midwifery of the Royal College of Physicians in London, Physician to her Royal Highness the Princess of Wales; and Senior Physician to the British Lying-in Hospital, second American, from the sixth London edition, 1806. The dedication of the first edition bears the date 1800.

Here is another "Treatise on the Management of Infants, etc.," by John Syer, Surgeon, London, 1812. It exhibits a list of subscribers to the book, as the custom was in those days.

Here is a treatise by an American, Dr. William P. Dewees, Adjunct Professor of Midwifery in the Univ. of Penna., Phila., 1826; and here one by Professor Eberle, of Cincinnati, 1833.

This book of 480 pages is an "Essay on the Laryngismus Stridulus or Croup-like Inspiration of Infants, etc.," by Hugh Ley, M. D., member of the Royal College of Physicians of London,

Physician to the Westminster Lying-in Hospital, etc., London, 1836. It is illustrated with lithographed plates.

Next is a work by C. M. Billard, Doctor of Medicine of the Faculty of Paris, translated and published in New York in 1839. This work is rich with Pathological Anatomy after the example of the great Bichat. Bouchut and Trousseau should be mentioned in this connection.

This is a copy of the "Lectures on Diseases of Infancy and Childhood," delivered by Chas. West, M. D., at Middlesex Hospital, in 1847, his material having been gathered in the Children's Infirmary. An excellent clinician was West, and he gave a powerful impulse to the study of children's diseases in England, as a distinct branch.

The Lettsomian Lectures before the Medical Society of London in 1863 were delivered by Thomas Bryant, F. R. C. S., Assistant Surgeon to Guy's Hospital. They were printed in the form of this little volume of 145 pages.

"Surgical Treatment of Children's Diseases," is the title of this book of nearly 700 pages, by Timothy Holmes, Surgeon to the Hospital for Sick Children, Surgeon and Lecturer on Surgery to St. George's Hospital, etc. This is a scholarly production — worthy of its great author. The second edition came out in 1869. In 1871, Guersant, of Paris, published his series of pointed practical papers on the "Surgical Diseases of Children."

Here is Mason on "Harelip and Cleft Palate," and here the able work of Meigs and Pepper, for a long time very popular in this country.

Then came Eustace Smith and J. Lewis Smith

and then Henoch — the venerable Dr. Edward Henoch, late of the Royal Charitè, Berlin. They were written in 1881. The Germans have done good work for children in studies of development, the kindergarten system, and allied lines of research.

This is Mr. Edmund Owen's "Surgical Diseases of Children," a most excellent little book, and here is one by Mr. Wright, of Manchester, on "Hip Disease in Childhood." It represents more practical experience than falls to the lot of most men, or gets into many text-books.

We now come to the most extensive work upon diseases of children yet attempted in English or any other language — the Cyclopedia of John M. Keating and a large corps of brilliant American, British, and Canadian authors. The Cyclopedia comprises four volumes. Here is one of them — 1,003 pages. Compare this with its predecessors, not only as to size, but as to contents, and the progress is wonderful. It is enough to make good old Underwood and Eberle and Dewees get up in their graves and have a look into its pages. It was published in 1889.

I should mention Goodhart, but I am omitting Jacobi, the pioneer pediatric teacher in this country, and O'Dwyer, and Holt, and scores of worthies. There are Dwight and also Ballantyne with frozen sections of the infant after the manner of study which made Symington famous. There are Lovett and Forcheimer, each with monographs, and Ashby and Wright, with their admirable text-book on "Diseases of Children, Medical and Surgical."

Dr. Starr, with an able corps of collaborators, has

produced "The American Text-Book" on this subject, and here is a treatise lately issued on the "Nervous Diseases of Children." It contains 666 pages — a large book to be devoted exclusively to one class of disorders in one class of patients. What strides are being taken in the progress of learning! Lastly, here is the very last book out on pediatrics. Dr. Rotch, of Boston, is the author. See the handsome engravings which characterize the modern book-maker's art.

Then there have been written a goodly number of articles and **books about nursing** — in general, and of children. But I have not had the good fortune to meet with many, as I looked about to prepare these lectures. I have seen allusions to Florence Nightingale's "Notes on Nursing," to a "Handbook for Nurses," by Mrs. Henry Smith, and a "Manual for Hospital Nurses," by Dr. Domville. But I have never had the pleasure of seeing any books upon the subject excepting "A Manual of Nursing" prepared for the Training School for Nurses attached to Bellevue Hospital, a text-book entitled "Maternity, Infancy and Childhood," by Dr. John M. Keating, also an excellent article by Miss Catherine Wood in Keating's Cyclopædia. None of these, excepting the last two, pay special attention to the nursing of children. To all the writers and workers mentioned, and more, I freely acknowledge my indebtedness.

This cursory sketch gives you but a hint of the literature of pediatrics. There is a great deal more, not only in English, but in foreign languages, and new books are coming out every week

— new books not only for the doctor alone, upon the medicine and surgery of childhood, but upon hygiene, nursing, and the general management of children. There are periodicals published in all the leading modern languages, devoted entirely to diseases of children, besides departments of pediatrics, and numerous contributions in many more magazines.

You may care to know a little something about the **hospitals for children.** The French early recognized the necessity and the propriety of hospital accommodations for children separate from those for adults, and separate wards and afterwards distinct hospitals were devoted to the care of sick children. The French were also first to attempt the education of imbecile children, away back in the seventeenth century. They were followed by the Germans in 1835, and the English in 1846. It was not until 1852 that the Hospital for Sick Children, Great Ormond Street, London, was founded. This is called " the mother of children's hospitals " in England. It now has seven large wards, with nearly 200 beds, treats 1,500 or 1,600 in-patients annually, and about 1,000 out-patients weekly. London also has the Northeastern Hospital for Children, treating 500 to 600 in-patients and about 14,000 out-patients annually, and the Evelina, with 66 cots, which takes care of about 1,000 in-patients and 6,000 out-patients each year. The East London Hospital for Children has 102 beds, and treats over 1,200 in-patients and more than 6,000 out-patients annually.

There is a large and beautiful hospital for children at Pendlebury, near Manchester, which is

more favorably situated as to surroundings than any of the London Hospitals, and does as much and as good work as any of them. Liverpool and other large cities of the British Isles have large hospitals for children, or wards set apart for their special care, as have also Berlin, Vienna, Paris and other great centers of population in Germany and France. This country was not far behind in the care of its children. In fact, in regard to the care and training of defective children it was earlier to take a high standing than any of the countries of the old world, excepting France. The United States now presents acknowledged models for the whole world in its institutions for the education of the feeble-minded. Each State has its school for the imbecile, deaf mutes and blind. As for children's hospitals proper, they are to be found in many of our large cities, and some have three or four. The principal cities having special hospitals for children are Philadelphia, Pittsburg, Albany, Brooklyn, New York, Atlantic City, St. Louis, Detroit, Boston, Baltimore, Washington, San Francisco, and Columbus. These vary in capacity all the way from a dozen or two cots up to 30, 40, 50, 60, 70 and even 100, as at the Boston and the Albany Hospitals, and at the San Francisco Hospital and Training School for Nurses. The Washington Children's Hospital holds 128, the Baltimore Nursery and Children's Hospital 200, the New York Nursery and Children's Hospital accommodates 450, and the Atlantic City Sea Shore House for Invalid Children 125.

Some cities have a hospital for women and children, or maternitè, where the infants also are cared

for. In this class are Chicago, New Orleans, Minneapolis, Syracuse, Cincinnati, Columbus and Cleveland. This, of course, makes no note of general hospitals where a separate ward or wards are devoted to children, as this class is too numerous to mention.

The best results can only be obtained where children are separated from adult patients (and it is better for the adults, too). Children need different environments, different management, different medical and surgical care, and different nursing from that required for adults. In the children's hospital the doctor and the nurse should be those who have been specially educated, trained and experienced in the care of children.

In all these hospitals and in thousands of homes throughout the country are sick, injured and deformed children, and wherever there is one there is likely to be also the doctor seeking to give relief or cure, and there is also the doctor's faithful ally, the nurse, ministering in a hundred ways to the little sufferer. Fully one-third of all the patients in a community are children; and you are sure at some time to be called upon to exercise your calling in their behalf, whether you nurse in hospital, in private families, or, mayhap, some day in your own homes. "But," some may say, "an ailing child is just like any other patient, only of course it is smaller, and there is no need of particular instruction as to its nursing, its care, or its management." A greater mistake could not be made. The child may appear to the casual observer "A little faithful copy of his sire in look and gesture," but I shall proceed to point out to you a few of very

many differences, beginning with the **anatomy.** To enable you to appreciate easily certain external differences, let me borrow from the sculptor's art the law of the proportions, and make a few comparisons. The **law of the proportions,** as you know, is no new invention or discovery. It was known to the artists of ancient Greece and Rome, and applied in the execution of those masterpieces of art which have challenged the admiration of succeeding generations and have been imitated without improvement ever since. They took the length of the head as the unit of measure and divided it into four parts. One part reached from the top of the head to the edge of the hair on the forehead; a second part from the edge of the hair to the root of the nose between the brows; a third part from the root to the lower end of the nose, and a fourth thence to the point of the chin. These parts were subdivided into twelve minutes, the minutes into halves, thirds, and fourths, and every member and feature of the body was conformed to these measurements in proportions to produce the most perfect symmetry. In the adult the whole length of the figure from the top of the head to the soles of the feet is eight times the length of the head, while the center — midway between these two points — falls exactly upon the os pubis, the front bone of the pelvis.

In the child at birth the whole figure is four heads long; in other words, one-quarter of the length of the child is head, and the central point is at the navel. A child two years old is about five heads tall, and at four to five years its head is one-sixth of its whole height. After the age of six,

growth in height goes on more slowly and it is not until the fourteenth or fifteenth year that we find the head about one-seventh part of the height, and the central point gradually approaching the os pubis.

The **head** is not only a great portion of the length of the infant, but it is great in its other dimensions. At birth the head exceeds in size the thorax—that part of the body that is boxed in by the ribs—and it is not until between the second and third year that the thorax increases enough to exceed the head in size.

Next to the head the upper **extremities** are the largest and strongest part of the infant. The legs and feet are quite diminutive, rounded, dimpled, pink-satin-cushiony affairs, of no particular use but to excite the rapturous admiration of mammas, aunties and other feminine friends. The thinness, softness and transparency of the **skin** belongs to infancy and children, as likewise the **rounded outlines** which are produced by a very thick layer of subcutaneous fat. The **fatty tissue** of a child is of a lighter hue than that of the adult, and while it is extra thick just beneath the skin it is not found about the internal organs nor cushioning the omentum as in adults. The **muscles** are small and soft and weak—weak not merely because of smallness but from lack of contractile force in themselves and lack of nervous influence.

The **bony framework** of the child is much less firm than in the grown-up person. Whereas in the adult the firm earthy salts in bone are about two parts to one part of animal matter, in the child the proportions are reversed: one part of earthy

salts, which give firmness, and two parts of animal material, which is soft and yielding. The ends or edges of the bones which form joints are quite soft comparatively, and in the long bones not strongly attached to the shaft. All the bones are smoother in outlines and surface, lacking the ridges, points, and knobs for the attachment of muscles and tendons. Of course, as the child grows up to maturity, and the skeleton and muscles develop, this general roundness of outline is lost, especially in boys, the masculine angularity of outline appearing, while girls retain even to womanhood more of the gentle and rounded curves of childhood. The periosteum or thin skin lying next to the bones, and by means of which bones grow in thickness, is thicker in the child than in older persons.

The bones of the fetal skull are partly membranous and partly cartilaginous and afterward gradually become ossified. The base of the skull is formed in cartilage and is the first to ossify, in order to protect the base of the brain—the pons and medulla—which are essential to life. The vault of the skull is membranous and remains soft much longer in order to yield to pressure and be temporarily moulded during parturition.

At birth the various bones of the vault of the skull are not yet united by bone, but the sutures or seams between them are membranous. The two halves of the frontal bone do not unite by bony union until after birth. Where the sutures cross there are open spaces called **fontanelles** or little fountains, from their wavelike motion with each impulse of the heart. The anterior fontanelle is

located at the crossing of the coronal and sagittal sutures and should have closed by the eighteenth or twentieth month. The posterior fontanelle is between the two parietal and the occipital bones. The scalp is very movable upon the skull of the new-born and the skull is so yielding that it may even bend by the weight of the brain and grow one-sided if the child be allowed to lie too much on one side. It would be very easily compressed by a bandage, or indented by a fall or a blow. The edges of the bones of the skull may be made to overlap where they meet, and the occipital can be pressed in between the two parietals in a way to cause convulsions (Marion Sims) even by laying the infant upon the back of its head. Gradually the bones of the skull become firm, a failure to do so indicating the presence of the disease known as rickets. The sutures and the fontanelles finally close, unless rickets or hydrocephalus (water on the brain) is present, when they may remain gaping or even enlarge.

The **brain** of the infant is very soft in consistence, being at birth not much firmer than clabbered milk or blanc mange, and held in shape by its membranes and the skull. Its fissures, its convolutions, and the sulci between them are not nearly so well marked nor so deep as in the adult. The gray matter of the brain is also but slightly represented. The brain is large enough, in fact, quite large in proportion to the whole size, to lead one to expect mental action; but it is the development as represented in the depth and arrangement of the convolutions and the amount of gray matter they contain, and not the gross bulk of brain, that

measure mental capacity, and these are lacking in the infant. They proceed to develop quite rapidly, and the brain also grows rapidly up to the seventh year, when it has attained most of its growth and only increases slowly thereafter.

The **eye** is very well developed at birth and would be capable of seeing well if there were only a brain behind it capable of taking cognizance of the images produced upon the retina.

The **hearing apparatus** is in a good state of development, though not so near perfection as the eye. At birth, the auditory canal inclines more downward as it extends into the head, and the ear drum is nearly horizontal. As growth proceeds, the drum becomes more upright and the canal nearer the horizontal line. The bony walls of the canal, especially the upper, are thin, and in case of abscess may break through and into the cavity of the skull instead of outward. The mastoid cells, of which one hears so much in ear disease of adults, are only rudimentary in the child up to puberty.

The **face** of the infant is very small in proportion to the whole head, mostly owing to the diminutive size of the undeveloped jaws. The lower jaw especially appears very light at birth and has a very slight curve at the angle, so that the gums can scarcely be made to meet in front. As the jaw develops and the teeth appear the corner of the jaw becomes more of a right angle, and the lower teeth meet the upper properly. Of the teeth I shall speak later.

Upon each cheek is a peculiar cushion of fat called the **"sucking pad."** It is formed of adipose

tissue surrounded by a capsule and is located upon the buccinator muscle. It is supposed to equalize the pressure and to prevent the muscles being drawn between the jaws in the act of sucking. These pads are distinct from the ordinary subcutaneous fat, and in diseases causing emaciation with absorption of the other fat in the neighborhood the pads remain and become all the more distinct. The **spinal column** of the new-born babe is straight and very flexible. It serves for scarcely more than a protecting canal to the spinal cord. It is not capable of supporting the body in an upright position, but bends over with the weight, usually bending forward, as the most weight is in front. It is not until the muscles have attained some strength and the force of gravity is brought into play that the natural curves of the spine as seen in the adult begin to be developed. The natural curves are all forward and backward, lateral curves being usually due to faulty positions assumed habitually during the period of growth, or to unequal muscular development. The angular curve is an abrupt bulging backward of some part of the spine due to the inflammation and softening (caries) of one or more of the vertebræ.

Infants should not be taught to sit up before the spine and its muscles are sufficiently strong to do so with ease, and the positions and muscular development of children should be constantly observed.

The **thorax** of the infant is small in comparison with the head and abdomen and is carried higher with reference to the spine, because the spine is not curved, but straight, in the dorsal region. The

top of the sternum is as high as the top of the first dorsal vertebra, while in the adult it has dropped to the level of the second. This height of the sternum is one reason that the neck of a child appears short. The **windpipe** of the child is about the caliber of its index finger. The cartilages of the trachea and of the larynx are comparatively yielding in infancy. The **larynx** is about the same in size in boys as girls until puberty approaches, when the male vocal box takes on a rapid growth and shows prominently in front as "Adam's apple."

Just behind the sternum of the infant is found the **thymus gland.** This is a peculiar vascular structure consisting usually of two longish lobes lying side by side, extending above the top of the sternum, and downward beneath it about the length of three vertebræ. It rests upon the pericardium and weighs about half an ounce at birth. After the second year of life it atrophies, and by the ninth or tenth has generally disappeared or is represented only by a small mass of fatty tissue. Its use is not certainly known, but it may have something to do with the elaboration of red blood corpuscles.

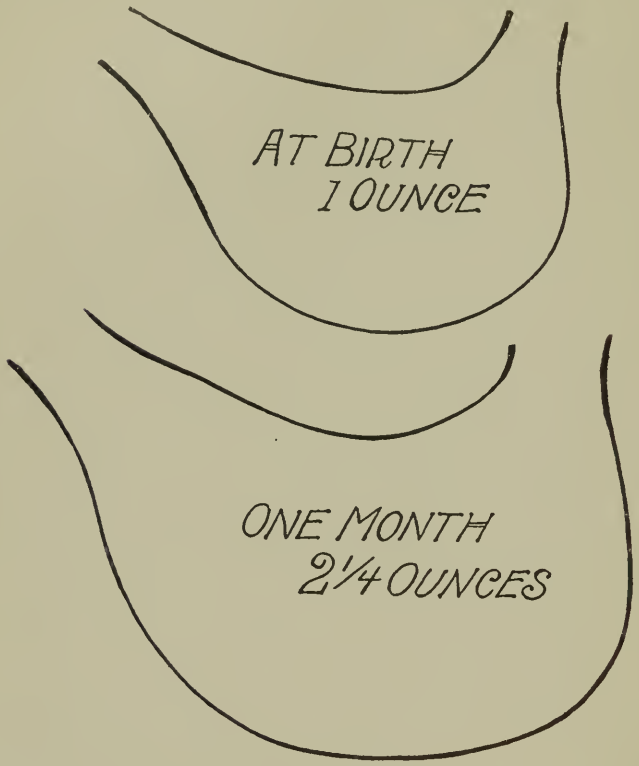
The **lungs** of the new-born babe are a pinkish gray in color and become grayer and darker as age advances, owing to changes brought about by contact with air. The points of the lungs extend two finger-breadths above the collar bones into the root of the neck. This is worth noticing when it comes to protecting them with clothing. It should also be observed how thin are the shoulder blades and the muscles adjacent, in the child, though they afford a thick protection to the thorax in the

adult. Remember this when you want to listen to a child's breathing or when you apply poultices or cotton batting in bronchitis or pneumonia. The child's chest walls are really thinner and the lungs more exposed behind than in front. The child's **heart** is about the size of his fist (not my fist nor yours), and its apex beat is felt a little higher than in an adult. I shall say more of the heart under physiology.

The **abdomen** is a large affair in early life and looks more so because of the smallness of the thorax and the pelvis. It accommodates not only the organs found in the abdomen of the adult, but also the bladder and upper end of the rectum. In the new-born the **liver** is very large, being one-eighteenth of the whole body weight, while in the adult it is one thirty-sixth. If a line were drawn from the cartilage of the lower ribs on the left side to the crest of the ilium on the right side, the liver would be found to extend from its position beneath the diaphragm nearly down to this line. As growth progresses the liver loses its disproportionate size, and also the diaphragm and ribs arch over and cover most of it, so that before childhood is ended it is felt but little beyond the margin of the ribs, in health.

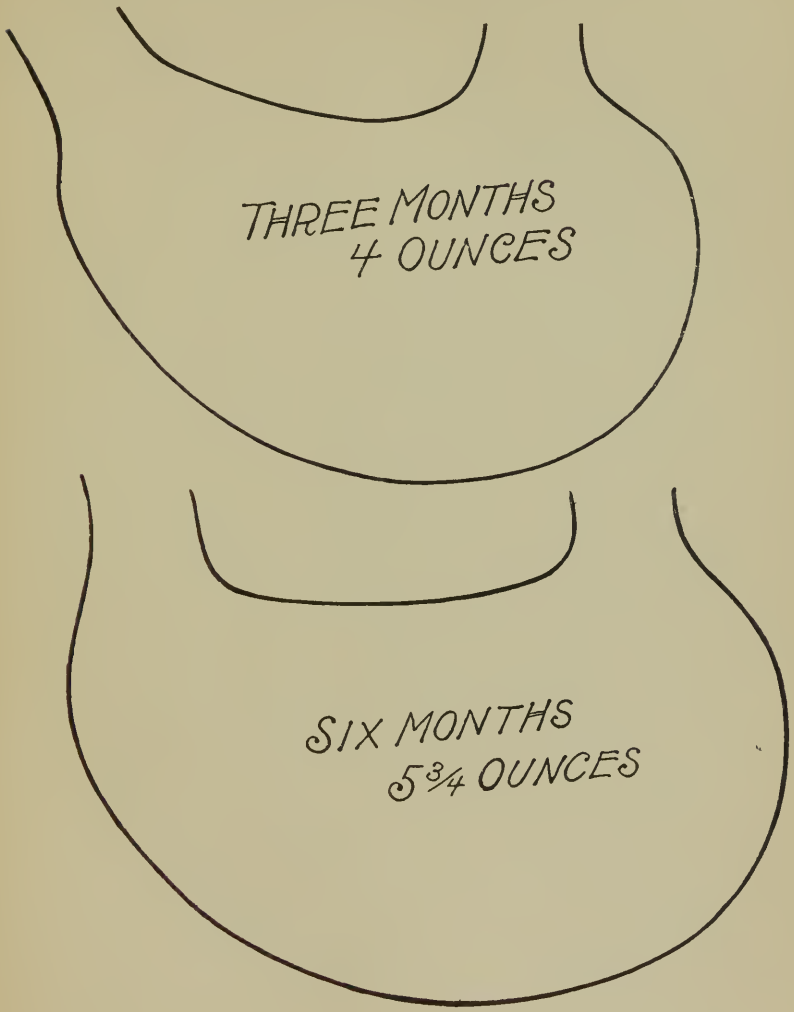
The **stomach** of a new-born babe is of the size and shape of this piece of cardboard and holds about one ounce, or scarcely that. Now don't be guilty of trying to put a teacupful of food or drink into a young baby's stomach. Here are other cardboard patterns to show approximately the shape and size of the stomach at various ages. If you will place the pattern on the page of your note

book and run your pencil around the edges, you will have about the size and outline. The stomach is rather straighter and situated somewhat more vertically in the infant than in the adult, and the valvular action at the cardiac orifice is said to be very weak. These have been

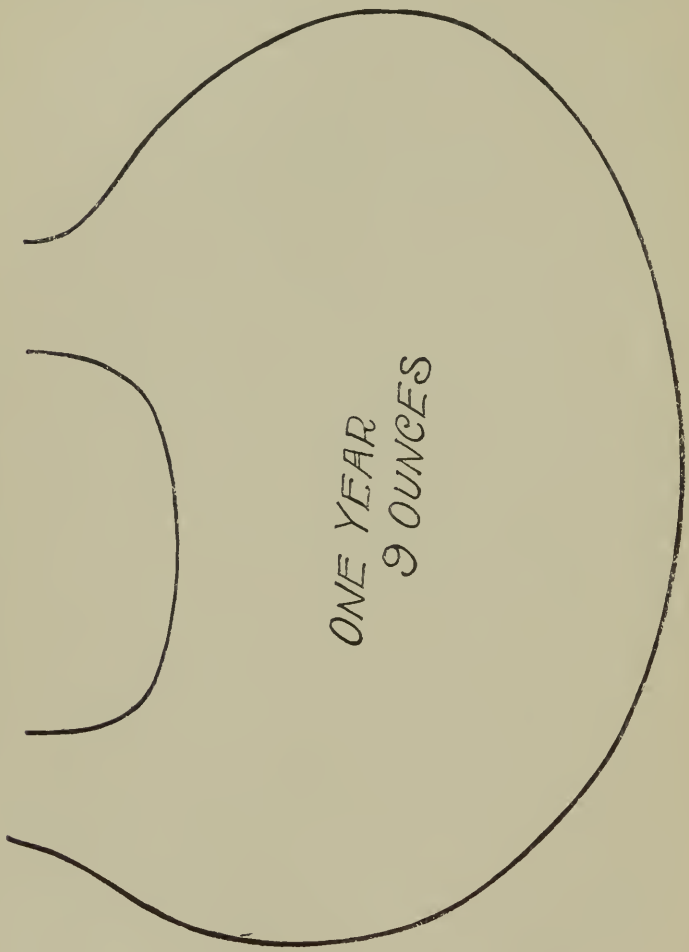


thought to account for the easy vomiting of infants; but Dr. Ballantyne attributes it to the fact that the stomach is so surrounded by solid organs. In front of the stomach and quite covering it is the left lobe of the liver. Behind it are

the spleen, the left suprarenal capsule and kidney, so that when pressure is exerted by the abdominal walls, very firm pressure can be applied to the stomach. This certainly accounts for the



force, if not for the ease, with which the contents are sometimes ejected from the infant's stomach. The **kidneys** are very well developed in the infant, and the suprarenal capsules, whose function is unknown, are comparatively large. The muscles of the back in the region of the kidneys



being but thin, offer slight protection to these organs and they can be easily injured by a blow.

The **small intestine** grows very rapidly after birth, increasing in length about four feet in the first two months. The large intestine occupies usually about the same relative position that it does in the adult, starting with the cecum in the right hypogastrium, ascending to the liver, then passing transversely to the left as far as the spleen, whence it runs downward to the rectum. But sometimes it crosses diagonally downward and to the left from the liver to the rectum. The cecum is apt to become impacted with fecal matter. Other points of obstruction, to either gases or fecal matter, are at the flexures under the liver and near the spleen, also in the sigmoid region where the descending colon enters the rectum. Colicky pains thus occasioned in infants and young children can often be relieved by a well warmed hand rubbing the abdomen gently in the direction of the colon—upward on the right side and then across and downward on the left side. Massage of the abdomen is also often useful in constipation. The mesocolon, and particularly the mesosigmoid (the fold of peritoneum which attaches the bowel to the spine), are usually lax and long. The sigmoid flexure, instead of occupying its usual position in the left hypogastrium, may lie across in the suprapubic region or even over near the cecum. The sigmoid often forms a loop hanging down into the pelvis, and liable to partial impaction with feces, occasioning an obstinate form of infantile constipation (Jacobi). Of intussusception,

or telescoping of the intestines, volvulus, or twists, and hernia, I shall speak later.

The **rectum** in infancy is a nearly straight tube lying against the sacrum, which is straighter than in the adult; and the straightness of the lower bowel and its vertical position account for the ease with which it prolapses through the sphincter ani of the child.

The bony basin called the **pelvis,** instead of being nearly horizontal as in the adult, in the young child is tilted far forward and is so small that it is scarcely a basin at all. There is not room within it for the bladder, which lies almost entirely above the os pubis. Besides the urethra and the insignificant prostate gland or the vagina, the pelvis contains little but the rectum and perhaps the loop of the sigmoid flexure.

The **omentum,** which in the adult is so often a large apron-like reflection of the peritoneum loaded thickly with fat, is a very small affair in the infant; as Mr. Owen says, it "but dimly shadows forth its future greatness."

The **abdominal walls** themselves, when once one is through the subcutaneous fat, are very thin. I have often seen cases of marasmus in which, the fat having been absorbed, the muscles were so thin that one could plainly discover the shape and movements of the intestines beneath.

The **umbilicus** or navel is a prominent landmark upon the abdomen. It is the scar left at the site of the umbilical cord, which healed off in a few days after birth. It is composed of strong fibrous tissue, in which the skin, the fascia, and the peritoneum join. Extending from it upward to the

falciform process of the liver, within the abdomen one can find the remains of the umbilical vein. Downward from the umbilicus, one can follow the umbilical arteries, which were really the hypogastric arteries, now extending as fibrous cords, one to each side of the bladder.

LECTURE II.

DEFINITION OF TERMS "NEW-BORN," "INFANCY," "CHILDHOOD," "YOUTH."—GROWTH AND DEVELOPMENT.—PHYSIOLOGY.

IT will be convenient to define just here the meaning of certain terms used in connection with the subject under consideration, viz: the words, "New-born," "Infancy," "Childhood," "Youth," and "Adolescence."

The term newly born, or **new-born,** has been applied to the babe during various lengths of its earliest (extra-uterine) life. Some writers have considered it entitled to this designation for the first week or for ten days after birth. Others have lengthened it to the first month. It is thought to be applicable during the period of transition from intra-uterine to extra-uterine existence, and certainly not all the vestiges of prenatal existence have passed away before it is a month old; so that the baby can very well be called new-born for the first month.

Infancy also has been variously defined. The French speak of *premiere enfance* as extending to the advent of the temporary teeth, that is, to about the seventh or eighth month, and *seconde enfance* from then to the coming of the permanent teeth, at the sixth or seventh year—thus dividing infancy into two periods.

The Germans call these *Säuglingsperiode* and

Kindesalter. I prefer the definition which limits infancy to about the first two and one-half or three years of life, or until the eruption of all the temporary or milk teeth. Then let **childhood** be understood to extend from the end of infancy until the permanent teeth appear at six or seven, when youth fills the years up to puberty at fourteen or fifteen. **Adolescence** then supervenes, and adult life may be attained at about the age of majority.

It is perhaps not necessary that these terms be always used with exactitude, yet they serve to designate pretty accurately certain **stages in the development,** some of the steps of which we shall consider more in detail.

At the moment of birth breathing begins, the lungs up to this time having had no function to perform, while the circulation which had been in operation in a peculiar way since early in fetal life takes on an important change. The blood of the infant no longer returns to the mother's circulation for aëration, after the cutting of the umbilical cord, but circulates through the infant's lungs. This throws out of use the foramen ovale, the ductus arteriosus and umbilical vein and arteries, which begin to close up, and, after a few weeks, in some instances after a few days, become impervious or disappear.

In the case of the vessels, they become mere fibrous cords, for it is nature's plan that an organ no longer useful shall atrophy or degenerate. The stump of the umbilical cord dessicates and separates at the level of the belly wall, the separation occurring between the third day and the seventh or eighth day, most often on the fifth day. The

site heals over and is puckered in by the contraction of the obliterated umbilical arteries and veins before mentioned.

The infant is no longer nourished by the mother's blood. Food must be placed in his own stomach, which instinct teaches him to do by sucking. The stomach begins its function of digestion, and the intestines begin absorption and excretion, the first which they deject being the meconium, a blackish substance which has accumulated there before birth.

The skin, irritated by the air, and probably by soap, water, and friction of clothing, grows quite red (in case of a Caucasian infant) for three or four days after birth; then changes to a yellow and finally after a few days more to white. Sometimes there is a distinct cracking and peeling of the scarf-skin during these changes of color. The new-born babe's hair generally falls and is renewed. The infant, at birth, averages nineteen to twenty inches in **length,** and in **weight** about seven pounds. Boy babies average longer than girls by a half inch, and heavier by about ten ounces. During the first two or three days of its life, the baby loses from four to seven ounces of its **weight,** which it does not regain till the fifth or sixth or sometimes the eighth or ninth day, after which the gain in weight is usually rapid. The following table from E. Pfeiffer (quoted by Ashby and Wright) shows the average of nine infants who were at first nursed at the breast and afterwards fed cow's milk also:

	Monthly Gain.	*Weight at End of Month.*
First Month,	13¼ oz.	8 lbs.
Second "	30½ "	10 " 4 oz.
Third "	26½ "	11 " 15 "
Fourth "	26 "	13 " 9¼ "
Fifth "	21 "	14 " 14¼ "
Sixth "	21 "	16 " 3½ "
Seventh "	17 "	17 " 5 "
Eighth "	21 "	18 " 10 "
Ninth "	23 "	20 " 1 "
Tenth "	20¼ "	21 " 5¼ "
Eleventh "	11 "	22 "
Twelfth "	7 "	22 " 7 "

Many observers have noted the growth in **length** or height. Quetelet (quoted by Ballantyne) found that in the early months growth in height as well as weight is very rapid. In the first month it increases 4. cm.; in the second, 3. cm.; in the third, 2. cm.; and in the following months from 1. to 1.5 cm. In the first year there was a growth in height of nearly 20 cm. (about 8 inches); in the second year 9. cm.; in the third year about 7. cm. (about 2½ inches).

According to Liharzik, an infant that is 50 cm. in length at birth by the end of the 36th month measures 105 cm., thus doubling its length in three years, while at the end of the 55th month it has only reached 115 cm. The most of this rapid increase in height is made by growth in the length of the lower extremities. I have before referred to the large size of the head and upper extremities. This was brought about by that peculiarity of the fetal circulation which sent the blood aërated and loaded with nutriment from the mother's system, first to the head and upper portions of the fetus,

thus increasing rapid growth and development of the brain and vital organs. After these are sufficiently developed for separate existence and the child born, it must be gotten ready for locomotion, so the circulation of the nutrient blood is more evenly divided, and the legs make haste to catch up to the rest of the parts. After they have in a measure made up for their early poor opportunities, growth in height goes on more slowly.

Observations upon the increase of the height and weight of infants and children are interesting and useful not only as indicating whether the child is up to the average for its sex and age, but because irregular variations from the average, or from the usual for that child, give important information upon the state of health and nutrition. Frequent weighings should be resorted to, to determine whether a child is gaining under a certain plan of feeding, though it should always be remembered that if all the weight gained is in fat, the food may not be the best after all. Failure to gain in weight or a loss of weight always indicates some serious trouble affecting the nutrition, and should be keenly looked into. Not only are the increase of height and weight of interest separately, but there should be a definite proportion between them. An increase of height without corresponding increase of weight is an evidence of weakness. I append a table as adopted by Ashby and Wright from Galton, showing the normal proportion of height and weight at various ages:

Height in Inches.	*Weight in Pounds.*	*Height in Inches.*	*Weight in Pounds.*
24	18	43	50
25	19	44	52
26	21	45	54
27	22½	46	55
28	24	47	58
29	25½	48	60
30	27	49	62½
31	28½	50	65
32	30	51	67½
33	31½	52	70
34	33	53	72½
35	34½	54	75
36	36	55	77½
37	38	56	80
38	40	57	82½
39	42	58	85
40	44	59	87½
41	46	60	90
42	48		

In regard to the greater development of the upper as compared with the lower extremities and their functions, some curious observations have been made, and strange significance can be put upon the facts. Nature never does anything accidentally, but ever by design. It seems obviously more necessary that the hands rather than the feet should early assume their functions, and yet the grasping power of the hands of the new-born infant and their instincts to take hold of anything which comes in contact with the palm and to hold onto it seem far in excess of any necessity of their present state of existence.

Every physician has observed this proclivity for **prehension** which is displayed by the infant, which will sometimes grip the fingers of the accoucheur or its own umbilical cord before the latter is cut.

I have often been astonished at their strength of grip and lifted them from the bed by their grasp upon my finger. Taken in connection with the relative strength of the muscles of the forearm, shoulder and chest it is certainly remarkable.

In a paper presented by Dr. Louis Robinson to the British Anthropological Association in 1892, the doctor recounted a series of experiments on the prehensile power of babies. He had found that in many cases a new-born babe, having grasped the index fingers of the experimenter, would hang and support its whole weight for a full minute by the watch, and some babies for a minute and a half. A few babies two weeks old hung on for nearly two minutes, and one of about three weeks old remained hanging for two minutes and thirty-five seconds. Several of the babies could hang on by one hand. Of course this feat is not to be compared to the record of a trained gymnast, but is remarkable considering the generally feeble condition of the muscular system of the new-born.

Yet the ability to do it seems no more remarkable than the instinct or impulse which leads them to do it. Dr. Robinson argued that it was a remnant of an instinct and a power necessary in an arboreal state of existence. The mother ape needs all her limbs for climbing, especially when climbing from tree to tree to escape from an enemy; therefore the baby ape must hang on by its own strength or be dashed to the ground just at a time when there was most danger. Thus the baby apes with best grasp survived, and the proclivity for grasping, like some other propensities

less useful or admirable, has survived to some extent to this day. You may accept this theory or not, as you like, but remember the baby's early impulse and ability to grasp and hang on to every object within reach even before he has any conscious intention or interest in so doing, and next to put the object grasped into his mouth.

Between the eighth or ninth and fourteenth or sixteenth months the infant learns to walk. This accomplishment depends not merely on the growth of the lower extremities, but on the ability of the nervous system to control them and to maintain a balance. The baby can generally hold up his head during the second month and sit up at about six months. If walking is delayed beyond a year and a half, one looks for some defect, if not of the locomotor apparatus, such as rickets, then of the brain or spinal nervous system.

The wonderful changes which the circulation undergoes at birth have been alluded to; but their intricacies are perhaps not very important to you from a practical point of view. We will note, however, some of the peculiarities in the **blood and circulation** in early life. The proportion of the whole weight of the blood to the body-weight is less in infancy and early childhood than in the adult. In the former it is as 1 to 19.5 (5 per cent.), while in the latter the blood is to the body-weight as 1 to 13 (or 8 per cent). In early life the blood is also less coagulable or coagulates more slowly than in the adult.

Numerous observations have been made upon the proportions of red and white corpuscles, the amount of hemoglobin, of fibrin, and other pecul-

iarities of the constituents of the blood, but many of these points have not yet been quite definitely agreed upon. Many questions in regard to the thyroid and thymus glands, and the spleen, which probably have something to do with the elaboration of the blood, are also yet unsettled in the minds of the physiologists.

But there are other peculiarities in the apparatus for the circulation of the blood and its action which claim our attention. Before birth the walls of the right and left ventricles of the heart are about the same in thickness. But after birth more work is put upon the left ventricle, which therefore is increased in thickness and strength so that by the time the infant is a year old the left is double the weight of the right. Before birth the wall of the right auricle is thicker than the left, but by the second month after birth the left has caught up to the right. From this time on more strain having been occasioned by the exercise of walking, the right auricle begins again and overtakes the left in growth. By the time that puberty is reached it is 1-20th heavier than the left.

Arterial tension is low in the infant and young child. One does not feel that elastic firmness of stroke in examining the pulse of a child. It is more like what in an adult would be called a compressible pulse, not forcing its way under the examining finger. This lowness of tension has been explained by Beneke as being due to the greater proportionate volume of the arteries as compared with the volume of the heart in the child. In the infant the volume of the heart is to the width of the ascending aorta as 25 to 20. Before puberty

the heart has increased until it is as 140 to 50. After puberty it becomes as 290 to 61. The rate of the pulse in the fetus at term is about 130 in boys and 140 in girls, though it is size rather than sex that determines the difference, as a large female may have a slower heart-beat than a small male.

In the first few weeks after birth the heart-beats may vary normally from 120 to 150 per minute. By the second year the pulse falls to 110, by the third or fourth to 100, by the seventh to 90, and by the twelfth to 80. While position makes no difference in the pulse of an infant and less in the child than in an adult, it should be remembered that the pulse is slower during sleep than in the waking state. Crying or a little excitement at the sight of a stranger or fear of the examiner will easily raise a child's pulse 10 or 20 beats per minute.

As might be expected, **respiration,** like the heart-beat, is much more rapid in the young than in those older. In the new-born it is from 30 to 50 per minute, averaging about 40; at a year old, 28 or 30; at three to five, 25 to 22; at twelve or fourteen, 20 per minute; in the adult, 20 to 16, averaging 18, with the pulse at 72.

The diaphragm is the strongest respiratory muscle in the young child, and in infants the type of respiration is abdominal or inferior. During childhood it becomes costo-diaphragmatic or costo-inferior (the ribs and diaphragm partaking in the motion); and this in the male continues to be the type in adult life, while in the female, as puberty approaches, perhaps earlier, as early as the tenth year, it becomes costo-superior (the upper portion

of the chest and ribs moving most in the act of breathing). This is nature's plan for obviating the difficulty that would ensue in case of pregnancy if the breathing were diaphragmatic as in the male.

We must now consider briefly the development of the **digestive system,** which plays an important part in the economy of children young and old, and a knowledge of which is so essential to an understanding of the problems of diet, both in health and in disease. Whole volumes have been written on this as on some other phases of our subject, but I must be content to present you only a few salient points, for the most part with a practical bearing.

The salivary glands secrete but little during the first two months of life, and for the first three or four months the saliva contains but little ptyalin, thus having only feeble power for digesting starchy food. By the fourth to seventh month, as dentition approaches, their secretion is much more free, and dribbling or drooling from the mouth occurs.

The gastric juice has only feeble digestive strength in the young infant, having no power adequate to the digestion of dry or solid materials, but only acting in the presence of a considerable amount of water. The infant having no teeth to masticate food, and the muscular movements of the stomach being insufficient for the purpose of crushing or dividing the food, it is at once seen that anything but fluid food, and that well diluted, is unsuitable for the infant's digestion. The secretions of the pancreas and intestinal glands have but feeble activity in early life.

The liver, as we have seen, is in infancy a very large and vascular organ, containing a quarter of all the blood in the body, and it evidently plays an important role; but just how far that part differs from its function in adult life, although it has been extensively discussed, we have no time to rehearse here. In fact, it is not yet satisfactorily settled. Doubtless its secreted fluid, the bile, effects the emulsifying of fats and aids their endosmosis into the vascular system; also increases peristalsis, acts as an antiseptic, and helps to convert starches.

The size, shape, and situation of the stomach at various ages, have been referred to under anatomy, and nursing and feeding will be discussed in another lecture.

The intestines promptly assume their duties of absorption and excretion, though they do little in the infant to aid digestion. However, gastric digestion not being completed in the stomach is continued after the food passes into the intestines. Defecation takes place two or three times a day in the new-born. After the first three or four days, the greenish black meconium having passed off, the stools assume a yellow color and a semi-liquid consistency. After the first two or three months of life it is normal to have two stools daily up to the beginning of the third year, and they become darker in color and more solid. From this time they gradually assume the frequency and character of adult life.

As before noted, the **kidneys** are of large size in the young child, and as might be expected their function is early and actively established. The

babe sometimes passes urine immediately after birth and nearly always within the first twenty-four hours. After this, micturition takes place ten or twelve times a day, always involuntarily. The involuntariness continues for at least six months and in the great majority of cases till the babe is more than a year and sometimes two years old.

Some mothers or nurses by training can induce habits of cleanliness at a very early age. I have in several instances seen perfectly regular and cleanly habits induced in babies under a year old, and once at the age of six months. But if involuntary micturition continues into childhood it becomes a disease known as enuresis. Parot and Robin state that the infant excretes four or five times as much urine in proportion to its body weight as does the adult. The new-born babe passes about an ounce at a time—(you will remember this is also about the capacity of the stomach of the new-born). This gradually increases in quantity, while the times of passing it diminish in frequency. The following table from Ashby and Wright will give you an idea of the normal quantity at different ages:

Age.	*Amount in 24 hrs.*	*Amount of Urea contained.*
2– 5 yrs.	About 15–25 ozs.	5 to 14 grammes.
5– 9 "	" 25–35 "	14 to 19 "
9–14 "	" 35–40 "	19 to 22 "
Adults,	" 50 "	30 "

The urine of breast-fed infants is paler in color than that of those artificially fed. All through childhood the urine is paler in color and of lower specific gravity than in the adult, from the fifth

to the fortieth day varying from 1.003 to 1.004 and up to the fourth month only reaching 1.005. After weaning it assumes gradually more of the character of the urine of the adult. It may be very difficult with infants to collect a specimen of urine for the doctor to examine, but it can be done by drawing it off with a catheter, or by having it passed upon clean sponges and then wringing them out. Or it may be collected by having attached over the genital organs an appliance made of rubber leading the urine into a receptacle.

The **temperature** of the infant undergoes a great change soon after birth. At birth it is 99 or even 100°, being higher than that of the mother, but within a few minutes after birth it sinks to 97° or, in a premature or weakly infant, to 96°. After a few hours it rises again and in a week is established at 98.2° or even 98.8° or 99°. This is to be regarded as the normal temperature taken in the rectum during infancy, childhood and youth. But the temperature, like the circulation and the respiration, is subject to rapid and wide variation from slight causes, owing to the instability of the nervous centers controlling these vital phenomena. Excitement, crying, struggling, will raise the temperature of the child, as will also the ingestion of a full meal. The normal daily range as observed in the adult is also found in childhood and even in infancy. This variation may amount to as much as two degrees, being highest at five or six o'clock in the evening and lowest between midnight and morning.

The temperature of the young is much depressed by exposure to cold, owing to the great vascularity

of the skin. It is also lowered by confinement to darkness, by sleep, and by inactivity. Further remarks upon temperature will be made under the head of symptomatology.

Last, though not least in importance, comes the consideration of the physiology of the **nervous system** in children. This is an important subject. I believe that a large part of the misunderstanding and mismanagement of children, both in health and disease, on the part of nurses and parents, arises in the failure to comprehend the state of the nervous system and gauge its influence in the case. This is not surprising; for if it is difficult to observe and calculate the operations of a complex machine when it is completed and running with a degree of regularity and precision, how much more difficult it is to understand and estimate it when some of its essential parts are only rudimentary, and others disproportionately developed and active; when now one and now another part is in the ascendancy, and the whole structure subject momentarily, hourly, weekly and yearly to change; and even the impelling power itself is irregularly applied.

You know that the nervous system is composed of two portions, the cerebro-spinal and the sympathetic. The cerebro-spinal consists of the brain and spinal cord. The brain is the seat of the perceptions, of memory, will and all intellectual processes and higher emotions. The spinal cord, besides conducting impressions to the brain and impulses from it, has the power of reflex action, such as the respiratory movements, or the withdrawal of an extremity that is tickled or pinched. Movements,

even for a purpose, are no indication of consciousness. It should be remembered, too, that the brain has the power to inhibit, that is, to control to some degree, the acts which are ordinarily involuntary; for instance, you can breathe deeply or can temporarily cease breathing, or can prevent your foot being moved if it is pinched. The sympathetic nervous system consists of ganglia or small centers and connecting nerves located outside of the brain and spinal cord, but connected with them by nervous cords. It presides over the organic functions, for instance, secretion and excretion, and influences the blood supply by varying the caliber of the blood vessels—subject to the vasomotor nerve center in the medulla oblongata. Some organs have nerve centers in themselves which furnish the nervous force for the function of the organ; for instance, the heart has ganglia in its substance which keep up its rhythmical contractions, but the rate of speed of these contractions is regulated by nervous influence from the medulla—influence through the pneumogastric nerve to slow the action of the heart, and influence through the cervical sympathetic nerves to accelerate its action. Moreover while the placing of food in the mouth would be sufficient to excite the secretion of saliva, the mere thought of food without any exciting stimulation of the nerves may cause the saliva to flow. A passing emotion may cause a temporary relaxation of the little muscular fibres which control the caliber of the blood vessels, and the result is a flushing of the skin—a blush. An emotion may accelerate the action of the heart, or a blow in the region of the stomach where the

solar plexus of the sympathetic is situated may send such a sudden shock to the nerve centers that the heart's action is completely inhibited—stopped—instantaneously. All of these operations, and more which I have not mentioned, are affected by interchange of influences between these various parts of the nervous system, in a very definite yet very complicated way which, while extremely interesting and important, would require hours for complete elucidation.

Now, when we recognize that it is during the period of greatest developmental activity that an organ or a system is most prone to disease or disorder, and recall the fact that the brain doubles its weight during the first two years and attains nearly all its growth by the end of the seventh year; that all these various nerve centers, with their correlated powers and their reacting and interacting influences, must become adjusted to a perfect balance, it does not seem strange that there should be numerous diseases of the nervous system, and all sorts of irregularities of function during this period of development and adjustment. We must remember, too, the relation borne by the blood supply of an organ to its functional activity and reflect upon the difference between the solid bony box of the adult skull containing a comparatively firm and consistent brain, as compared with the soft and yielding cranium with unclosed sutures, of the infant, whose brain is also plastic, yielding to an increased vascular pressure, or easily drained of its usual blood supply. What wonder that we get such sudden excitement or such rapid depression. The spinal cord with its reflexes is

peculiarly active in infancy, while the controlling influence of the higher centers has but little power. Thus an irritation caused by indigestible food in the intestines may cause not only violent peristaltic action and a free exudation of serum into the bowel (diarrhea), but even spasmodic and disorderly contractions of all the muscles, in other words, general convulsions, and high fever—all coming on in a few hours. Bear in mind, then, the instability of the nervous apparatus in early life, and the extreme excitability of the lower centers.

Not only are the sympathetic and the spinal nervous systems too often left out of the account, but the psychical force and limitations are wrongly estimated.

Most persons have a very inadequate conception of how much, or rather how little, a baby thinks, and what the emotions and the mental powers of a child are at two or even at five years of age. And it seems to me that the painters and the poets have frequently aided doting parents in keeping up this misconception, and have made hard work for the scientists to educate the people. You have all seen some of the impossible countenances that certain old masters have given to their children. One of the poets sings:

> " Has she a wonderful wisdom,
> Of unspoken knowledge a store,
> Hid away from all curious eyes,
> Like the mysterious lore
> Of the bees and the birds and the flowers?
> Is this why no word
> Has ever been heard
> From this silent baby of ours? "

Another writes:

> "He speaketh not, and yet there lies
> A conversation in his eyes;
> The golden silence of the Greek,
> The gravest wisdom of the wise,
> Not spoken in language, but in looks,
> More legible than printed books,
> As if he could, but would not, speak."

This is beautiful as poetry, but it is not very accurate as physiology.

The development of the child's **mind** has been very carefully studied by a few physiologists, and also by psychologists and pedagogues. It would be better for the race if all mothers and nurses would interest themselves in child study. The investigations of Preyer and of those who have pursued their observations in a similar way have given us more of accurate and valuable information than all the theories and speculations which the ages before had produced.

The physiologist recognizes that the senses are the pathway to the mind, the way by which all communications from the outer world must be carried to the living organism, to the nerve centers in the brain, which alone are capable of receiving impressions. When the mind learns to locate sensations as to time and place it has a perception of the sensation, a percept. When the cause of the sensation dawns upon the mind it has an idea, a concept. This is the dawning of the intellect. Then develops the will, which can only be studied through its operations upon the muscular system—the movements of the child. Language and self-consciousness come later.

Taste is the first of the special senses to be

manifested. A child only a few days old will discriminate between something sweet and a sour or bitter substance placed upon the tongue. The sweet, as sugar or glycerine, will bring to the face an expression of satisfaction, while quinine or vinegar will cause a wry face and perhaps crying. This is evidently a provision of nature toward an ability to select suitable food, which is the first want of the young animal. Very closely allied to taste in point of necessity and in time of development is the sense of smell, which is early manifested by the new-born, almost immediately after birth. The power to discriminate between sensations received through the skin whether of temperature or of contact, is developed more slowly. Although the child cries if put into cold water it is merely because he is rendered uncomfortable and not that he distinguishes cold as cold. Likewise warmth makes him comfortable. After he has experienced both cold and warmth he learns to discriminate between the two. The young babe does not resist a wet hand or a strong grip at first. As to hearing, it is several days after birth before the path through the auditory apparatus to the centers in the brain is capable of transmitting impressions, and for a long time hearing is very imperfect. This doubtless saves the child from many harmful alarms.

The organs of sight are well developed at birth and the nerve paths open to the centers and back, for bright light will cause contraction of the pupil and even closure of the eyelids — mere reflexes. But colors or shapes are not perceived — only differences in brightness, and the young babe has

no sense of the location of the light, no perception of time or space.

A sensation, for instance that of light, is repeated at intervals. The recurrence of these sensations and intervals being often repeated give to the dawning mind an idea of time. The light appears now higher, now lower, now to the right and now to the left, and after repeated experiences of this kind comes an idea of space. The sense of touch and the other special senses also contribute to the formation of the idea of space. Hearing seems to note most accurately the passage of time.

The infant mind now begins to recognize a relationship between perceptions. The coming of that object with the soft voice is apt to be followed by a drink of that sweet warm milk, and he recognizes that the mother is the cause of the milk. In other words, he gets an idea. It is by the combination and separation of ideas that the whole world of thought is made up. It is important to note that the baby has sensations, perceptions and ideas before he has any words to represent them. During the second three months of life the normal babe is able to distinguish the faces of parents or nurse from those of strangers, and is also capable of manifesting astonishment or fear. The babe does not give evidence of will power till it is three months old and then it comes gradually. The only means we have of judging of the action of volition is, as has been said, by the muscular movements. Certainly there are numerous and varied movements before this age is reached, in fact, movements are made before the child is born,

and immediately after birth one may observe innumerable grimaces and twitchings and jerkings of different muscles, stretchings and bendings of the arms and legs, and crowing sounds. These are purely involuntary, and are not even caused by any noticeable irritation of afferent nerves. They are due to irregular discharges of nerve force proceeding from nerve centers or cells. Then there are reflex movements produced by irritation of peripheral nerves, this irritation being conveyed to nerve centers and exciting an impulse which proceeds from the nerve center to muscle and cause a motion. For instance you tickle the baby's foot and the leg is drawn up. This is involuntary and does not even need a brain for its performance. A sleeping child or a sleeping dog or a child born without a brain or a frog with its head cut off will do the same thing. The nerve cells in the spinal cord are capable of so much. Another class of movements is called instinctive. Examples of these are sucking and licking. The instinct to suck is strong soon after birth, but if the child be not allowed to nurse for several days sometimes the instinct becomes enfeebled or lost and only with great patience and persistence can it be made to perform the act of sucking. Volition cannot occur without ideation; ideation cannot occur without perception, and perception cannot occur without a sensation to be perceived, consequently all the operations of the mind depend fundamentally upon the integrity of the senses, and if one or other of the senses is congenitally imperfect or absent, in-so-far must the mind be crippled. When the mind is capable of comparing perceptions and

referring them to their proper causes, it may proceed voluntarily to execute a movement with a definite object in view. Also the memory may store up perceptions and ideas and the higher nerve centers may compare or rearrange these and initiate action as a result, without any newly received sensation to excite it. The infant makes attempts at grasping objects held before it during the second quarter of the first year. The head may be held up and well balanced at about the sixteenth week, and this is probably an effort of the will. At about the same time he makes attempts to sit up and may accomplish it well at the fortieth week. All these dates are of course liable to considerable variation as the child is weak or strong and well developed, and also according to hereditary influences. The infant may attempt to stand as early as the thirty-eighth week, and should be able to do so by the eleventh or twelfth month. With support, efforts to stand may be made as early as the twentieth week. At nine months most children can creep, though some never creep before walking. Walking may be accomplished any time between the eighth and the sixteenth or seventeenth month. It is probable that the acts of sitting, standing, crawling, walking, jumping, running and throwing are instinctive, and do not have to be learned by imitation. Imitation is an evidence of will power, therefore of a certain amount of intellect. But if the intellect stop developing at the level of imitation it would be sadly lacking in the higher faculties. One sees a good many individuals in society whose development seems to have stopped at imitation. As early as the first

half year the infant may show individuality, personal peculiarities.

The sounds which the babe utters even in the seventh to ninth month are usually without significance as language, but in the last quarter of the year he may begin to imitate words or sounds pronounced in his hearing and so begin the acquisition of language. There is a wide difference in the age at which language is acquired. It may have been well begun before the end of the first year and in other cases it may have made but little progress by the end of the second year. There may be considerable intellection before language is acquired, but even the possession of language and ability to express his own sensations does not prove the child capable of forming higher concepts or ideas. With these brief and necessarily incomplete remarks upon the nervous system in infancy, I must close this lecture, for our time has long since expired. I can only beg of you to read further upon the subject and to study and observe for yourselves. I am sure you will find it more interesting than the training of lap dogs, tabby cats, or canaries.

LECTURE III.

VARIOUS PATHOLOGICAL CONDITIONS.—DEFORMITIES, DISEASES, ACCIDENTS, INJURIES.

YOU should have some general idea of the classes of diseases and other troubles which occur in children. Of course the **malformations** become evident at birth, and when not so extreme as to be incompatible with extra-uterine life, come at various ages, sooner or later, for surgical cure or alleviation. This class is very numerous, and I need only mention harelip and cleft-palate, meningocele and spina-bifida, extroversion of the bladder and many varieties of malformation of the genital organs and the hernial openings; clubbed hands and feet, webbed fingers and toes are a few more of the lengthy list.

Then there are **diseases and injuries incident to birth.** Atelectasis (failure of lungs to expand); hemorrhages about the skull — outside of it or inside of it; hemorrhages at the umbilical cord, inflammation of the eyes, of the umbilicus and of the breasts, and other septic infections; jaundice, lockjaw, broken skull or collar bones, fractures of bones of the limbs, and dislocations of joints occurring at or soon after birth.

Hereditary diseases often manifest themselves soon after birth, notably syphilis and tuberculosis. In regard to **syphilis,** I must give you a word of warn-

ing. Even as found in the infant it is contagious, and instances are on record of nurses through ignorance or carelessness acquiring this dreadful disease from their little patients.

The infant can acquire the disease in the act of birth or afterwards, in which case its manifestations are similar to those of the adult, the initial sore followed by secondary skin rashes, mucous patches, condylomata; and the tertiary or third stage coming after years, perhaps involving bone, brain, internal organs, in fact, any tissue in the body. But the syphilis found in the infant is most frequently acquired by inheritance from one or both of the parents. Its manifestations are similar to those of the secondary stage of acquired syphilis. It may show the disease when born, being a weazened, premature-looking creature, with a weak, hoarse cry; though sometimes syphilitic babies are as fat and plump as any. It may at birth have a skin eruption — perhaps bullæ, which are like blisters containing pus or bloody serous fluid, and located on the feet and hands, legs and arms, especially the palms and soles, and also on the forehead. All the skin eruptions of syphilis are apt to choose these locations. They may not come out till the child is a month or six or eight weeks old. Then comes a crop of little red spots or else pimples or pustules or bullæ. Or it may be in scaly patches or in circular crusts piled up in layers to a conical point. The less severe eruptions may fade and leave a coppery color. The eruption is apt to be preceded by snuffles. Snuffles is perhaps the commonest symptom of hereditary syphilis. The child may be born with it or

it may come a few weeks later. Snuffles is an inflammation of the mucous membrane lining the nostrils, sometimes seriously interfering with breathing and persisting without other symptoms of "a cold." The discharge from the snuffling nose is contagious. The lesions may consist of ulcerations in the mouth, inside of the cheeks, upon the tongue or tonsils, or cracks upon the lips, notably at the angles of the mouth and center of the lips; or there may be condylomata, looking like a crop of pimples crowded close together and with their tops ulcerated, and located near the mouth or near the anus. The discharges from these lesions are very contagious. Not all the snuffling noses and not all the eruptions upon the skin are syphilitic, but if any of these lesions make their appearance upon a child under your care, you had better keep your suspicions and your kisses to yourself, until you draw the attention of the attending physician to the trouble and hear his decision.

The bone diseases and other late manifestations of syphilis which are apt to come on in youth or approaching puberty are not contagious.

Hemophilia, the bleeding disease, may show itself in infancy; but the other hereditary diseases, as epilepsy and insanity, will likely show later, if at all.

The **rickety deformities,** bowed legs or arms and contraction of the pelvis come after locomotion has been practiced. Spinal curvature and pigeon-breast may come at any time.

Of course the **infectious diseases,** whose germs lurk everywhere, find their victims first in early

life. As a rule (not invariably), one attack renders the system immune to any subsequent exposure, and children are attacked rather than adults, because most adults have had these diseases in childhood. However, a person escaping till adult life is less liable than a child and may never have them. Some of these diseases, as scarlet-fever and measles, are less apt to attack an infant at the breast than when it is older.

Diseases of the **digestive tract** form a large class, and these occur frequently after changes in the method of feeding, for instance, subsequently to weaning. They are not due to changes of diet alone, but prevail at this period because the digestive organs are at this time actively undergoing development. This illustrates **a law of pathology** that is repeatedly illustrated in the diseases of children, viz: that the period of greatest developmental and physiological activity in an organ or system of organs is also the period of their greatest pathological manifestation.

I will now give you an account more in detail of certain **conditions, emergencies and accidents,** and afterward of a number of prominent symptoms of diseases; and this for two reasons; first, the nurse will have under given circumstances certain duties herself to perform; and, secondly, it is expedient that the nurse be acquainted with symptoms and have some idea of their possible significance, and so know whether it is necessary to call the doctor or to make a note of the occurrence for the doctor's information when he comes.

The first subject I shall mention is **hemorrhage.** Having learned that the quantity of blood in pro-

portion to the body weight is so much less in the child than in the adult, and that the tissues of children are very vascular, and that their blood coagulates but slowly, you will not be surprised when I tell you that children bleed very rapidly, and that they bear hemorrhage badly. A child cannot stand loss of blood even in proportion to its size and weight nearly as well as a "grown up," and the careful pediatric surgeon is very saving of blood in operations. The practical point for you is that in case of accident you appreciate the extra risk of blood loss and so make extra efforts to control it. After operation wounds, if there is oozing under dressings, oozing which you would think of no consequence if the patient were an adult, in the case of a child you would see to it at once and inform the doctor. The means of **controlling hemorrhage** in case of accident are the same in the child as in the adult. Those which a nurse might be expected to employ would be direct pressure where the bleeding is from a definite point. This pressure is best applied with the end of a clean finger. Where there is oozing from a surface, pressure can be applied with a pad of gauze or cotton, or a sponge. Pressure may be applied to the main vessel supplying the bleeding part if the nurse possesses the requisite anatomical knowledge, the end of the thumb being the instrument, applied where the vessel passes over a bony surface. Or pressure may be applied to the whole limb above the wound by encircling it tightly with an elastic bandage or piece of tubing — the Esmarch method. If such an elastic bandage or tourniquet is not at hand, one can encircle the limb

loosely with a handkerchief, place beneath it a piece of stick, clothes-pin, ruler, or poker, and twist it quickly till the blood stops — and no tighter. This is the point I want to emphasize. Remember the soft tissues of the child and don't twist it too tight — you can do great damage. I have seen the "Spanish windlass," as this kind of tourniquet is sometimes called, applied tightly enough to stop the sap in a tree, one would think. This is not necessary. Pressure of the tourniquet should not be long continued lest gangrene result. It is only a temporary method of controlling the hemorrhage till the surgeon can tie the vessels or otherwise permanently control it. Oozing of blood may be controlled by cold or by heat — very cold water or an ice bag or ice in a towel, or a sponge or towel dipped in water that is very warm to the hand (112° F.), and then applied; or the water hot or cold may be poured upon the oozing surface. One usually prefers heat to cold in children because the effect as a hemostatic is more permanent, and because it combats shock. The bleeding part should always be elevated.

Next a few words about **shock**. Shock, as you may have learned, is defined as an impression more or less profound made upon the nervous system and through it upon the heart and circulation and all the vital functions, caused by physical injury or mental emotion. The symptoms of shock are a feeble compressible pulse or no pulse at all. The pulse may beat first slowly, afterward very rapidly. The temperature is below normal; if below 96° it is apt to be fatal. The surface is cold and bathed in cold perspiration. The muscles are all

relaxed. The patient keeps any position in which he is placed. He may be semi-conscious or dazed. There may be nausea or vomiting.

Now, having learned that the nervous system of the child is unevenly developed in its various parts, unstable in its equilibrium, and irregular in its action, the sympathetic system being given to all sorts of pranks, you are prepared to believe that children are affected very severely by shock. You will therefore, in case of severe accident, be very assiduous in the use of your means of combating the shock that is likely to come. You will be ready with your hot water bags, bottles or jugs, warm blankets, and all means of applying external warmth, which is the greatest remedy for shock. Apply warmth to the spine and abdomen and all about the patient; or place him in a warm bath. Let him lie on his back with the head low; and you may give him hot beef tea or hot coffee by the stomach in small quantities, or the same in the form of an enema to be retained. The doctor may order hypodermics or alcoholic stimulants.

In preparing a child for operation you will take extra precaution to guard against shock by dressing the little one warmly (albeit loosely), covering every part of the surface possible, excepting the field of operation. The extremities can be swathed in thick cotton batting bandaged on. You will provide dry sterilized towels instead of wet ones to surround the field of operation. You will also have your hot water bags or bottles at hand, and the cot thoroughly warmed, ready for the little patient to be placed therein. But though the child suffer severely from shock, when he does

survive it and react he is apt to go clear to the other extreme of fever and excitement; and you will have to be on the watch to withhold your stimulating things as he comes up to the normal. Once over the immediate effects of accident or operation, such are the building powers of the growing organism that one may hope for almost anything, certainly for a great deal more than in the case of an adult, in the way of recuperation and repair.

One of the emergencies very likely to come to those who have the care of children is that of **convulsions** or fits — spasms. Another, less likely, is that of **fainting** or swooning — syncope. I mention these together not because of any pathological relationship, but because one is likely to be mistaken for the other. More than once have I been told by a mother or a nurse (of course I would not insinuate that she could be a hospital trained nurse), that the child had "fainting spells;" but when I had an opportunity to see one of the fainting spells it proved to be a spasm. Now if a child has any sort of a "spell," whatever else you do, keep your eyes open and observe what is going on, so that you can describe it to the doctor. What was the child doing when the attack came on? Had he been extremely fatigued? Suffering from pain? or excessive diarrhea? or hemorrhage? or been frightened by the sight of blood? Did he seem to feel the coming of any seizure? Were the face and lips pale? The skin cold and wet, the pulse weak, the muscles relaxed so that the patient fell and remained limp and motionless, with breathing scarcely apparent? If so, it was a case of syncope

or fainting? Or was there, with the loss of consciousness, stiffness of some of the muscles? Perhaps rolling of the eyes or twitching of some of the muscles of the face or extremities? This is not syncope, but spasm. It is the slighter degrees of convulsions that are mistaken for fainting. In the severe seizures where there are grinding of the teeth, foaming at the mouth, with snoring or strangling sounds in breathing, dusky lips and violent jerking of the limbs and drawing of the muscles of the face, there is no difficulty in recognizing that it is a fit and not fainting. What are you to do? If it is a fainting you will lower the head, loosen the clothing, raise the extremities and rub them toward the body. Get a supply of fresh air. Hold a little ammonia near the patient's nose after trying its strength on your own. Remember that strong vapor of ammonia is caustic, and the mucous membrane of the child's air passages perhaps more delicate than your own. If the condition persists, proceed as for shock, with warmth and stimulants. But if the fainting is due to internal hemorrhage you will not use alcoholic stimulants. As for external hemorrhage, stop the bleeding before using stimulants.

If it is a convulsion, what is its gravity? Broadly speaking, convulsions in children are very much less serious than convulsions in adults, and in infancy less serious than in childhood or youth. The younger the safer, with the exception of the new-born children. But the gravity depends on the cause, and causes are various. I will mention some of them and the relative gravity in different cases. Sympathetic irritation — as by indigestion,

teething, worms, preputial irritation — nothing serious. Some young children are liable to repeated attacks. Also, convulsions may be symptomatic of some disease of the nervous system itself, as meningitis, brain tumor, chronic brain disease — which are very grave; or infantile paralysis — not so dangerous to life. Sometimes they are present in a condition known as rickets — which may be cured; or in anemia or exhaustion — very serious.

Again, spasms are due to the action of some poison in the system, as alcohol or other narcotic poison, or leucomaines (poisonous results of fermentations) formed in the intestines; or by uremia; or by the germs of scarlet fever, measles, pneumonia, or whooping cough, and possibly bronchitis. Of these diseases, scarlet fever is the one that is the most apt of all to be ushered in with a convulsion. Breast milk in some peculiar way disordered or poisoned by a fit of anger on the part of the mother may produce convulsions.

Convulsions have been aptly termed the rigors of childhood. Under circumstances in which an adult would have a chill or rigor the child takes a convulsion.

I said possibly bronchitis might be classed as a cause of toxic convulsions. But it is not quite clear whether it belongs there or in the next class, which may be called thermic. Some children with the neurotic tendency are prone to go into spasms as soon as they have a rise of temperature from any cause, no matter what. A cold or a little indigestion or any cause that will give them four or five degrees of fever will induce a fit. Perhaps this will some day be proven to be due to certain

poisons in the system, either introduced into it from without, or elaborated within the organism. But so far as we now can understand, certain cases are the effect of fever alone.

Besides these, there are the convulsions of true epilepsy, and this may be accompanied by the condition of idiocy or imbecility. It should also be borne in mind that hysteria sometimes occurs in childhood and youth; and that malingering (pretending) is not impossible. These latter never bite the tongue and always find a place to fall without being hurt. The malingerer does not froth at the mouth unless he uses soap or some other substance held in the mouth. Hysteria may resemble syncope as well as epilepsy. But in syncope the extremities are cold and all muscles relaxed. In hysteria the extremities are warm and an attempt to open the eyes is met by efforts to hold them shut. In epilepsy or hysteria there is generally a history of previous attacks. In convulsions from other causes there may have been previous attacks.

The prognosis in all these cases depends on that of the disease which causes the convulsion. It is rare for a child to die in the first convulsion. There is always danger of permanent injury to the nervous system.

In epilepsy or hysteria all that would be necessary for you to do would be to lay the patient on the back, loosen the clothing, especially about the neck, and prevent him from biting the tongue by placing between the teeth a knot tied in a handkerchief, a piece of wood, or a cork, especially a rubber cork. A rubber teething ring is good for

this purpose. It is not necessary in any case to attempt to control the convulsive movements by holding the patient fast, but only so far as to prevent his injuring himself against surrounding objects, or by falling out of bed.

These directions are also proper in managing spasms due to tumor or chronic brain disease. But if the spasm is thought to be of reflex origin from deranged stomach or colic; or if probably due to the onset of acute disease, as scarlet fever or measles (in addition to the above directions), a warm bath with cold wet cloths or affusions to the head will prove serviceable. The bath may be as hot as 100° F., and a spoonful of mustard may be added. Care should be taken not to scald the unconscious child. and not to have the mustard too strong. I once saw a child severely burned up to the armpits with hot water and mustard by an ignorant and excited mother. The child died — it seemed to me more from the effects of the skin lesion than the original disease. Better omit the mustard than have it too strong. The child can stay in the bath two or three minutes, sometimes much longer. If there is no suitable bath tub, or the child is too rigid to be placed in any tub at hand, blankets can be wrung out of the hot water and the child enveloped in them. In case of colic, or in almost any case of spasms, a copious enema of warm water with a little soap is of advantage. In spasms due to hyperpyrexia (a temperature of 104°, 105° or 106°), no treatment other than medicine is so useful as a tepid bath brought down to cool or cold by the addition of cold water. Either the hot or cooling bath may be repeated as needed.

If there is known to be chronic brain disease, or the spasms come in the last stages of an exhausting disease, as diarrhea, the hot bath does no good and may do harm.

A bath is cold when its temperature is between 33° and 65° F.,' cool at 65° to 75°, temperate at 75° to 78°, tepid at 85° to 92°, warm at 92° to 98°, and hot at 98° to 112°. Always test the bath with a thermometer, if one is to be had, and never rely upon the method of the nurse in the following squib which Dr. Ballantyne picked up somewhere:

Anxious Mother: "I wish, Susan, that when you give baby a bath you would use the thermometer so as to ascertain whether the water is of the proper temperature."

Susan: "Oh, don't you worrit about that, ma'am, I don't need no 'mometers. If the little 'un turns red the water's too hot. If he turns blue it's too cold, and that's all there is about it."

Nose bleed is a very common occurrence in children, not only because of blows or falls to which they are so liable, but in the course of whooping cough, typhoid and scarlet fevers, measles, grippe, disease of the spleen, and heart disease. It may be caused by local disease, as ulceration, or a varicose condition of the blood vessels in the nostrils. It is generally not dangerous, but may be so in hemophilia or in typhoid states, when the blood is deteriorated and the patient weak. In typhoid it may also indicate a tendency to hemorrhage elsewhere (in the bowels).

In case of nose bleed you should not allow the child to lean over with the head low. He should sit erect or recline a little backward. If possible,

induce him to avoid blowing the nose or sniffing, but let the blood clot in the nostrils. Often the bleeding can be stopped by simply holding the nose gently but firmly between your thumb and finger for five or ten minutes. Cold applied to the bridge of the nose is good, also, syringing with very cold water, or with vinegar, or with a solution of alum; or blowing dry powdered alum or antipyrin into the nostrils. If the bleeding persists you may have to call the doctor to apply other remedies or to plug the nares.

Children are liable to **fractures** of their bones and **dislocations** of their joints, with what relative frequency or in which particular bones we cannot stop to discuss. But there are some peculiarities about these injuries as they occur in the young that we must observe. I have in a previous lecture mentioned the softness of bone, the thickness and loose attachment of the periosteum, the weakness of the muscles and abundance of subcutaneous fat in children as compared with their elders. Also the fact that the articular ends of a bone are cartilaginous and develop bone by separate centers, being attached to the shaft only by the epiphysial cartilage, where the bone grows in length.

The softness of children's bones make them sometimes bend instead of breaking, or partly bend and partly break — the so-called greenstick fracture. People are apt to overlook this injury, there being no extra mobility, the bone seeming quite firm, and no crepitus (that is grating together of the broken ends of bone) and not complete loss of function. For instance, I once had a child brought to me three weeks after an injury, in

which I found what had doubtless been a green-stick fracture of the radius and ulna which had united in a vicious position, preventing rotation of the forearm. I was obliged to break them over again to straighten and restore function. The softer bones of children are not so apt to splinter, therefore not so apt to lacerate the tissues, which are also somewhat protected by the thicker periosteum. The loose attachment of the periosteum makes it more likely to peel up from the bone. If the periosteum is torn through, the fascia, muscles, vessels, nerves and skin are more easily lacerated than in older persons. The muscles of children do not draw so powerfully upon the broken bones, and so cause deformity at the point of fracture, or cause laceration. In young infants the muscular action is sometimes scarcely noticeable, and crepitation is not so sharp as in the harder bones of greater age. Owing to the more yielding ligaments, dislocations are easily effected. I have seen a dislocation of the upper end of the radius caused by taking a child of two years by the forearm to dance about the floor with him; another, by the mother grasping the forearms crossed in front of a restless child as he lay in his crib and pressing them down with "there now, go to sleep." The child screamed with pain and I found the radius dislocated at the elbow. I recall another case of dislocation caused by the mother taking the child by one forearm to lift it up a step. It is wrong to lift or swing a child by the extremities.

An injury peculiar to the young is **separation of the epiphysis** from the shaft (that is, of the end that forms the joint from the main body of the bone).

These do not become united into one solid bone, in some instances, until adult life is reached. In the young a separation at this point is often more easily produced than either a fracture or a dislocation. It is apt to be mistaken for a dislocation, being so near the joint; or the joint being found movable, it may be overlooked altogether or considered a sprain, as crepitus is often quite dull owing to the flat and comparatively soft surface at the separation. This injury is as important as a fracture of the shaft, often more so, because of proximity to a joint, and because injury here sometimes interferes seriously with subsequent growth of the bone in length.

All injuries to bones and joints are apt to be masked by swelling, as in adults, and by the thick layer of fat, as is occasionally the case with adults.

There is one injury which is most apt to be overlooked at the time from the remoteness of the part where the effects are apparent. Often after a tumble a child refuses to use his hand or his arm and it is examined and no injury found. A week or so afterward when "the callus" has formed, a lump is discovered on his collar bone and likely a crook in the same, a fracture having occurred at that point.

Now, in the case of an injury **it is wrong** for the person in charge to go to pulling and working at the part to "put it in place," or discover the nature of the injury; nor should any bystander be allowed to make such manipulations. By such handling the injury may be made twice as bad as it was at first. Injury is sometimes increased in removal of garments. The injured part should be

carefully supported in the position in which it is found, or in a position as near the natural as it will assume without force, and the doctor called. If it is necessary to transport the child or to wait long for the doctor, a temporary splint should be applied. This, in the case of an extremity, may be a pillow upon which the limb is laid, the sides of the pillow rolled around the limb and so held in position. Or it may be splinted by a couple of rulers or pieces of slate frame, or shingle, or strips of stiff pasteboard, or canes, or umbrellas, or similar articles, these being placed one at each side of the injured limb and tied on in at least three places with handkerchiefs. The splints should be padded if the clothing has been removed from the limb. If the injury is at the hip the outside splint should extend up the body to near the armpit. If at the collar bone or shoulder the arm should be supported in a sling or the sleeve pinned across the chest, or the patient lie quietly upon his back, till the doctor comes.

In removing clothing from an injured arm or leg, undress the uninjured extremity first. If the right arm is injured take off the left sleeve first. If necessary, cut the garment open with scissors.

Children are more likely than any other class, unless it be lunatics, to **swallow foreign bodies.** Coins, marbles, buttons, pins, safety pins, carpet-tacks are among the common articles swallowed. I once knew a child of four years to swallow a cloak pin consisting of a metal plate about two inches long and a third of an inch wide with a pin hinged upon it, which was open at the time it was swallowed. This passed safely. Almost anything

that will pass into the stomach will pass the rest of the way, unless it is of such a shape as to puncture the walls of the intestines, or injudicious means have been used to hasten its expulsion.

But often the mother or nurse will announce to the doctor with some pride that she had the presence of mind to give a good dose of castor oil or salts as soon as it happened. That is wrong. By emptying the intestines and increasing peristaltic activity the danger of injury is increased. If instead of the cathartic, only bulky food be given, such as will fill the intestines with a large and slowly moving mass, for instance, boiled rice or potatoes, the foreign body becomes imbedded therein and passes harmlessly.

Children very frequently put similar small articles — as peas, beans, paper-wads, pebbles, into their **nose or ears,** and some children have such a propensity for it that they will repeat the performance many times even after punishment. There is no end to the variety of the articles one finds in the nostrils. I remember once finding a sponge the size of a walnut, and a foul mass it was, in a child's nostril. The condition may be noticed soon, or not for some time, or its true nature not suspected. I recall one case in which I removed from the nose of the child a shoe-button, which, according to the history of the case, must have been imbedded there for sixteen months, the nose being treated meanwhile for catarrh. Often in recent cases the foreign body may be dislodged by getting the child to blow forcibly through the obstructed nostril, the other nostril being held shut; or if in plain sight it may be

easily removed by slipping past it the bent end of a hair-pin to which a little crook has been added, and so drawing it out. If in plain sight in the ear and of a shape to be easily seized, it can be withdrawn with tweezers. But you would better not be poking into the ears with any wires or hair-pins.

Foreign bodies in either nose or ear, if not of a substance that will swell by being wetted, such as peas or beans, can often be removed by syringing with water. In the nose the water is introduced at the open nostril, and made to flow out through the obstructed one. The mouth should be held open meanwhile.

Choking is not uncommon in children, often by such bodies as a morsel of meat or gristle which is too large to be swallowed and sticks in the pharynx, obstructing the glottis or trachea; or such small articles as a kernel of corn or of a nut, a bean, or a button, may be drawn into the chink of the glottis, or clear into the larynx or trachea, and thus occasion strangling, unless removed. In many instances of the former kind, the foreign body can be removed by your fore-finger, hooked into or behind it. Or, pick up the child and hold it head downward while you give it one or two sharp thumps on the back of the thorax with your open hand. This with the coughing and gagging may expel the body from the larynx. If not so fortunate, the doctor must be summoned at once, even if breathing becomes easier, or difficulty of breathing occurs only by spells. If the offending body is not known to have come away, the doctor should be called, for it may only have changed its posi-

tion temporarily and is likely to cause obstruction at any moment. There is no safety till it is removed, possibly by laryngeal forceps, probably by an external opening.

Burns and scalds are only too common in children and are dangerous according to their depth and also according to the amount of surface affected. If more than half the surface is burned or scalded, the result is generally fatal. Death may be by shock, by blood poisoning, exhaustion, lock-jaw or a peculiar ulceration of the bowel.

The clothing should be cut away from a severe burn or scald, so as not to tear the injured surface. If clothing or cinders adhere to the burned surface the parts should be immersed in warm water in which common baking soda — mind, not washing soda — is dissolved, and so soaked and floated off. There is no danger of getting the soda solution too strong. Extensive burns can be treated continuously with the bath, or a very little carbolic acid can be added to the bath; or the soda can be spread upon the burn in a thick layer and then covered with absorbent cotton or cotton batting and a bandage. If the whole is enveloped in oil silk or rubber sheeting, all the better. Or the burns can be covered with cloths saturated with olive oil, cream, vaseline, unsalted lard, or butter, or tallow, castor oil, cotton seed oil, linseed oil and limewater (Carron oil), or flour and lard mixed into a stiff salve; the dressing is then covered with cotton-wool, or oil silk, or both, or oiled paper. In the absence of any oily or waxy preparation, or of cotton, cloths can be saturated and kept wet with the soda solution. In the absence of any other

dressing, plain water at a comfortable temperature, sometimes cool, does pretty well.

If the burn is made with acid, as muriatic, nitric, or sulphuric, it should be covered with the baking soda or chalk, or lime, or whitewash, whiting, magnesia or lime water. After the application of the neutralizing agent, the parts should be deluged with water and dressed as directed. In burns with caustic alkalies, such as ammonia, lye or potash, the caustic should first be neutralized with a weak acid, as vinegar or lemon juice, and then water; or, unless these are just at hand, irrigate copiously with water and then dress as directed.

In children more than any other class occur **scalds of the mouth and throat,** often from attempts to drink from the spout of a teapot or kettle; or burns of the same parts from swallowing the caustic alkalies or acids. Here similar means should be employed to neutralize the acid or the alkali and to mitigate the suffering by a coating of bland oil —as sweet oil. In these injuries there is introduced a new element of danger in edema of the glottis, which may come on and produce suffocation, unless promptly relieved by the doctor. Also there are dangers from the injury to esophagus and stomach with which only the doctor can cope. The use of anodynes is also best left to the medical attendant, but stimulants may be needed early in shock from excessive burns and can be administered by the nurse.

In subsequent dressing of burns it is best not to expose the whole burned surface at once, but a portion of the dressing at a time should be removed and immediately renewed.

LECTURE IV.

SYMPTOMS AND THEIR INTERPRETATION.

WE will devote this evening to symptoms and their interpretation. Not that I expect in an hour or two to make of you accurate diagnosticians; but I hope to lead you closely to observe your little patients; and I believe that I can in this way give you much in a limited time that will enable you to recognize symptoms when you see them, in many instances know something of their significance, and the importance of their being reported to the doctor.

One of the first things that strikes the observer is the **color** of the patient. I have spoken of the pallor during fainting. Sometimes the patient is almost as white constantly. In the former case the blood has temporarily forsaken the skin because of failure of the heart. In the latter case it may be due to a lack of blood either in quantity or in red corpuscles, that is **anemia,** bloodlessness. Anemia may be caused by hemorrhage in any form, or by the drain of diarrhea, or some fault in the digestion or assimilation of food; or after severe illness with deterioration of blood, notably scarlatina, typhoid fever or diphtheria.

If the pallor is accompanied with puffiness of the face and extremities it denotes kidney disease (and this may have come from scarlatina). Some

children have naturally a very white skin, but in these, if in health, the lips are rosy and the conjunctivæ are not blanched as in anemia. On the other hand the face may be flushed and the lips too red and dry, as in fever. A bright flush confined to the cheeks is often found in lung fever. If it is only on one cheek the lung on the corresponding side is affected. A circumscribed flush over the cheek bones in a chronic case is apt to be found accompanying a remittent type of fever, perhaps with chills and sweats, due to tuberculosis or chronic suppuration somewhere (hectic). A circumscribed transient flush upon the forehead, face or ears of a child indicates brain disease. A very intense redness of the face is often found with scarlet fever, though the characteristic eruption (of closely, finely sprinkled scarlet points) does not usually show upon the face. The only redness of face approaching that of scarlet fever is found in poisoning by deadly nightshade or one of its derivatives (some preparation of belladonna or atropin), or by the Jamestown weed or "Jimson weed" (stramonium), of which children sometimes eat the seeds. In this kind of poisoning the pupils are widely dilated, and there are hallucinations of a lively character.

A dusky flush is sometimes seen in typhoid fever. A blue skin — as blue as if dipped in a solution of indigo — is seen in some congenital malformations of the heart or vessels, often the pulmonary artery, or patency of the foramen ovale (which should have closed at birth). A lesser degree of blueness, amounting only to lividity, would be occasioned by a lesser degree of malformation or dis-

ease. The blueness or lividity may appear only upon exertion, crying or laughing.

Deep redness, almost purpling of the lips, and to some degree of the whole face, with a fulness of the face, is seen in valvular heart disease, often mitral insufficiency. The same puffiness of the face with suffused eyes, and perhaps injected eyeballs, is seen in whooping-cough.

The saffron yellow hue of the skin and conjunctivæ, due to some forms of liver disease, is easily recognized. But do not mistake the usual slight yellowing of the skin in the new-born for jaundice. In the later stages of scarlatina, the skin undergoes desquamation or scaling. The cuticle comes off in bran-like scales resembling dandruff, or in larger patches, sometimes sufficiently large pieces to show the shape of the part whence they came, for instance, the fingers. This desquamation may go on for weeks unless the process is hastened, as it should be, by frequent bathing.

The skin-lesions of measles consist of deep red spots, appearing first on the face about the fourth day after the onset of the sickness. The spots (circular in shape, perhaps an eighth to a quarter inch in diameter) may be separated, or may be so close as to constitute patches, and they soon make their appearance over the body and limbs as well as the face.

The skin-lesions of chicken-pox are most apparent upon the back. They also appear upon other parts of the body and even upon the limbs and scantily upon the face. There is first a red spot or pimple which becomes a blister. It looks like a little half globe filled with clear fluid. This

changes to a scab, which, when it comes off, does not leave much of a scar unless there has been much scratching.

The **hair** furnishes an indication of the constitution and state of the child's health. A shock of coarse hair generally accompanies the thick skin, tumid upper lip, big belly, heavy features, and probably swollen cervical glands and scars from previous glandular inflammations, found in the type of "coarse struma" or scrofula.

Silken, fine hair goes with the delicate skin and features and slender frame, often so much admired, of "pretty struma," or fine struma, the subjects of which are so apt to die early of tubercular meningitis or mesenteric disease, hip disease, spinal caries, phthisis pulmonalis, or some other form of tuberculosis.

Smooth, glossy hair indicates a healthy state of nutrition; dull, lusterless and rough hair just the opposite. After severe illness, for instance after scarlet fever, in which the skin is so much affected (then why not the appendages of the skin —the hair and nails), the hair is often dry and harsh as a bunch of straw.

The fine long hairs sometimes found on the bodies of new-born babies generally drop out and disappear. The extremities and backs of some children are covered with a growth of long downy hairs; this is said to indicate weakness, but certainly does not in every instance.

One sometimes sees a growth of hair upon a diseased or disused limb, for instance, in hip joint disease. This reminds one of moss that grows better on a decaying tree than on a vigorous one.

The state of the **nutrition** attracts our attention. If much wasted, there has probably been diarrhea or indigestion; though, there may be tuberculosis, continued fever, chronic suppuration, more rarely cancer, or diabetes. No acute diseases waste the patient so rapidly as those of the digestive organs, particularly if accompanied with high temperature and diarrheal discharges, as in cholera infantum. No cause of extreme emaciation is so common as the atrophic changes in the intestinal coats that follow some of the diarrheal diseases and give rise to the condition known as marasmus.

Localized swelling without redness, heat, or pain, and sometimes with pitting on pressure, is **dropsy**. If showing first in the face, it is usually due to kidney disease; if in the feet or ankles, to heart disease, and if in the abdomen, to liver disease.

The **attitude and motor state** have been alluded to under syncope and convulsions, but require further study. Certain of the muscles may be flaccid—one or two extremities relaxed and cold. This is paralysis. Certain muscles only may be rigid or jerking—localized spasm, or spasm and paralysis combined, so-called spastic paralysis, from central causes. A limb may be held rigidly by involuntary fixation of muscles through the reflex nervous system,—evidently nature's endeavor to secure rest by rendering immobile inflamed structures adjacent—for example, muscular ankylosis, which causes thigh and pelvis to move together as one solid structure, in inflammation at the hip joint. This may come on so suddenly as to be mistaken for a dislocation. The board-like abdominal muscles found in peritonitis also illustrate this condition.

A child, oftenest a girl, drops things from the hands repeatedly, reaches for them jerkily, or stumbles frequently in walking. She may have almost constant unsteady, purposeless movements of a hand or foot or any part or parts. Twitching, nodding, grimacing,—this is **St. Vitus's dance.** The movements may become so violent as to require confinement to a bed or a padded room, and be accompanied with great weakness of body and mind. This disease is often associated with heart disease and rheumatism, but usually ends in recovery unless complicated. Good nourishment is necessary. The nurse may have to feed the child like a baby. All study and excitement should be avoided.

Whereas, healthy children are active and like to jump about, children with **rickets,** with their big bellies, narrow chests and slim, crooked legs, like to sit still. Like the celebrated jumping frog of Calaveras County after he had his stomach filled with shot, they refuse to jump. One sees them sitting around in infant asylums like so many clay-colored toads, winking solemnly, listlessly,—it is pitiful. They may cry with pain if you lift or move them. They want to be left alone. Rickets is a disease of nutrition. The bones are soft and the muscles and ligaments weak. This leads to bending of the long bones if pressure is brought to bear upon them, as of the legs or thighs in walking, or of the arms or forearms in creeping. The epiphysial cartilages, at the wrists especially, and on the ribs, are often enlarged. The soft cartilages of the ribs yield, while the sternum stands stiff, like a "pigeon's breast." The teeth come late. The fontanelles fail to close. The bowels

are distended with gases. Attacks of bronchitis are frequent. Bad feeding is the usual cause—bad feeding, with lack of air and sunlight and warmth. The management is obvious—proper feeding and general hygiene. In bad cases, until the bones are stronger, the child should be kept lying down, lest deformities, such as bow legs, saber legs, bowed arms, curvature of the spine, or contracted pelvis, result.

When a child persists in lying upon one side (or nursing always at the same breast, which amounts to the same thing), look for trouble in the pleura or lung of the lowermost side. If he lies with head bent back and neck muscles stiff—mischief in the spine or base of the brain, probably meningitis. He refuses to bend the neck or some portion of the spinal column, squatting instead of bending to reach an article on the floor—search for spinal caries. He lies on his back with thighs held drawn up—inflammation in the abdomen. But if he only draws them up to kick out again there is irritation and pain, not inflammation. He rolls his head constantly from side to side upon the pillow—indigestion, worms, rickets; if also half comatose, hydrocephalus or pseudo-hydrocephalus. He refuses to use one hand or one foot—undress the child and look him all over and compare the two sides. He carries one hand repeatedly to the side of the head while crying or fretting—earache or neuralgia from teething. If he buries his face in the pillow or otherwise avoids the light, suspect either sore eyes or brain or meningeal disease. When he persistently picks at the nose or rubs it, if there is no local cause of irritation or tickling, either the child

has been given opium or else there is reflex irritation from the alimentary canal, possibly worms. Scratching at the fundament in the absence of eczema, itch, or other external irritation, would indicate irritation within the rectum—probably thread worms, pin worms. He drops things from his hands repeatedly, reaches for them jerkily, or stumbles frequently in walking—suspect the coming of chorea (St. Vitus's dance).

Much is revealed regarding the state of the child's health by observation of the **head** and face and the mental condition. I have, in the first lecture, alluded to the large size of the head in children. A discussion of the size and shape of the head as found in hydrocephalus, tumors of brain, rickets, syphilis and idiocy would be too long for our present purpose. But I will remark that the head can vary considerably from the usual in size and shape and yet be healthy. A head somewhat larger than common does not necessarily indicate water on the brain, nor one something smaller that the child is an idiot.

The state of the **fontanelles** of the infant require a word. If they are sunken, the condition is one of anemia or exhaustion. If bulging, there is vascular fullness or excitement or intra-cranial pressure from some cause. If the anterior fontanelle remain open after the eighteenth month it is an evidence of rickets. Probably delayed dentition or a soft condition of the ribs and long bones with enlargement at the epiphysial cartilages will also be present.

The **face** of a sick child is not only fat or thin, flushed or pale, but it bears other indications of

the disease, and expressions of the sufferings, needs and wishes of the little patient which are as plain as written words to one who can read them, and you should be able to do so. They often give truer information than any spoken language; and frequently there is no other given since the patient cannot speak at all. Who could mistake the face of **cholera-infantum,** with ashy white skin and livid lips, with sunken eyes which roll about in their sockets, following you to all parts of the room beseeching for water—wild with eagerness at the clink of a spoon in a glass? Answer that appeal. Give water—a drop or two at a time every few seconds, or give tiny bits of ice. Much at a time would cause vomiting or purging. Though all food must be withheld, give water or ice in this way.

In **typhoid** or long continued fevers, the expression of the face is dull and often the lips are encrusted, and they crack and bleed when the child cries, unless kept moistened with glycerine and water. In **pneumonia** and **bronchitis** the face often wears an anxious look, and the child attends strictly to the business of breathing, scarcely wanting to stop long enough to take a drink, and the nostrils dilate with each breath.

In **croup** the anxiety increases to fright and, if the dyspnea increases suddenly, to terror, with starting eyes and struggling for breath.

M. Jadelot believed and taught that there are certain lines upon the face which indicate the seat of the disease, and it would seem that there is something of truth in his statement. I have never been able to satisfy myself that the Frenchman's

system was always to be relied upon, and I notice that authors generally quote his statements without either endorsing them or denying their truth. Suppose you observe for yourselves and either prove or disprove them. M. Jadelot called the line or furrow which extends from the inner corner of the eyé outward and downward to the cheek bone the oculo-zygomatic line, and said it indicated brain disease. The line extending from the ala of the nose outward and downward upon the cheek he called the nasal line, and considered it an indication of disease of the digestive tract. The labial furrow running from the angle of the mouth downward was thought to signify disease in the respiratory tract. This much is certain, the expression of the face generally tells us if there is pain somewhere. If there is a mere "twitch" of the features, Fothergill attributes it to abdominal pain, and it is a sure sign if the upper lip is raised. A frown indicates pain in the head. I have sometimes seen a frown of one eye, with a cringing motion of the head and elevation of the corresponding shoulder in severe earache. One sees the same motions, without the frown, and a listening expression upon the face, with pain in the neck. The nose takes on a pinched look with pain in the chest, and if the lungs are affected the nostrils work as before mentioned. When the little one smiles in his sleep, the fond mother says he is having an interview with the angels, but the matter-of-fact doctor says it's more likely worms or indigestion or colic, one or all.

It would take us beyond our limit of time to go into the subject of the condition of the pupils, but

I must tell you the normal state of the eyes during sleep and save some watchful nurse a fright. During natural sleep the eyeballs are turned far upward and the pupils are contracted. In uneasy sleep they may be rolling in their orbits. You may raise the eyelids of the sleeping child and see them and think he's going into a fit. A permanent downward displacement of both eyes, with a small face and large, globular cranium, indicates hydrocephalus (water on the brain).

A child, in the beginning of deep-seated mischief within the cranium, for instance tubercular meningitis, will sometimes gaze intently at the ceiling or some place in space, momentarily oblivious to surroundings. People imagine his thoughts are far away beyond the ken of ordinary mortals who have tramped the mud of this earth longer. Here is a picture of a child with expanded brow, delicately outlined cheek and ethereal eyes. It was published lately in one of the monthly magazines, and is entitled "The Look Beyond." Now, I don't like to see children looking like that. They are apt to go beyond.

The **cry** of the child is another signal which you should learn to interpret—it always means something. Children, except young infants, don't cry for fun. A well child seldom cries. Even the cry of disappointment or of temper in older children is soon changed to a more cheerful tune if the child be in health. The cry of the child immediately after birth is part of nature's plan to establish respiration. It is reflex in origin, being caused by the irritation from contact of air or water with the skin, or even by pressure, for the child will at-

tempt to cry before it is actually born. In children prematurely born, or with incomplete expansion of the lungs, the cry is feeble—a mere wail. The cry usually ceases when the child is comfortably dressed and warm, and is not renewed unless there is discomfort or reflex irritation of some kind, or hunger, thirst or pain. Older children may cry from fright, vexation, or anger, and, rarely, for dramatic effect; but because an infant under three or four months old is crying without shedding tears, he is not to be accused of wilfully "putting it on." Tears are not secreted till after that age. But the absence of tears during the crying of a sick child more than four months old indicates very serious disease. The cry of hunger or thirst is strong and vigorous and is usually kept up till appeased by food or drink. There is only one other cause than hunger or thirst to provoke persistent and continuous crying, and that is earache. The cry elicited by the pains of colic is more intermittent and accompanied by squirming and kicking. The cry from the distress of an overloaded stomach is more of a whining. Pain in the chest (as pleurisy) occasions a stifled cry; the child is afraid to cry—starts to cry and then suppresses it. It is the same in pulmonary diseases, either because crying causes pain, or because the child hasn't time to cry,—has to keep busy breathing with his crippled lungs in order to get enough air. In inflammation within the skull the child may occasionally emit a shrill shriek. That is the *cri hyderencephalique* of the French. It may or it may not be present. In exhausted or atrophic states, as marasmus, the cry may be scarcely audible. The child wrinkles

up the face and attempts to cry, but gives it up from sheer weakness and discouragement. Children sometimes wake up crying and screaming in the night, as though frightened. This is sometimes due to beginning cerebral disease or to the pain of hip joint inflammation, or oftener still to indigestion or intestinal worms. The hoarse voice (like the baying of a hound) is heard in spasmodic croup, and is familiar to all who work with children. It sounds alarming to the inexperienced, but is very comforting to the doctor's ear, as compared with the voiceless whispering cry and the hissing cough of membranous croup.

Cough is strangely absent in the early stages of bronchitis and pneumonia, and the cough gets worse about the time the state of the lungs gets better. People sometimes think it cannot be a chest disease because there is not much cough at first, and later are surprised when the doctor pronounces the case past the worst, when the cough is so much worse than before. At this point let me impress upon you the advantage of an even temperature, warmed and moistened air, in acute respiratory diseases. Warm steamy air helps croup, bronchitis and pneumonia. It eases all the acute coughs but that of the relaxed throat, which gets worse in warm air (and this is not common in children), or the cough of heart disease. Infants and young children do not expectorate. If anything is coughed up it is swallowed.

Watch the **breathing** of the sick child. In pneumonia it is easy but too quick—altogether too quick—40, 50, 70, 80 times a minute.

In bronchitis it is quick, but more force is re-

quired to draw the air through the obstructed tubes, and it may be noisy—wheezing. In spasmodic croup the air is drawn in through the larynx with difficulty, and in true croup it is forced both in and out with the greatest labor, the accessory muscles of respiration being brought into play, and the spaces above the clavicles and below the ribs and sternum sinking in at each inspiration.

The respiration may be labored also in emphysema, in asthma, and in diseases of the heart. Even in health the breathing of a child, especially of a young child, is not as rhythmical as that of an adult; but in certain deep-seated diseases of the brain it becomes markedly irregular—faster for a while and then slower. In estimating the rapidity of the child's respiration due allowance must be made for his age; but whatever the age the respiration should correspond to the pulse in the ratio of 1 to 3½ or 4, that is, one breath to four heart-beats. A child with enlarged tonsils or overgrown glands behind the tonsils snores in sleeping and has a nasal intonation when talking. He usually breathes with his mouth open, has narrow nostrils and a stupid appearance, which is often increased by slight deafness. He is often flat chested, round shouldered and weakly, or becomes so unless properly treated.

Now a few remarks upon the **pulse.** I would like to describe to you in detail the varieties of the pulse and the conditions producing them, but this, though an interesting subject, is too long for us, and is rather for the doctor than for the nurse. Yet I have often thought that doctors must either train nurses to make further observations upon the

pulse and make them correctly, or else make more for themselves. I have sometimes feared that the thermometer and the temperature chart upon which the pulse rate is also noted have made it too easy to read off these second-hand observations and omit others of equal or great qualifying importance. It is not enough that the number of beats per minute or the degree of fever be recorded. Was the skin wet or dry when the temperature was taken? Was the pulse full, firm, compressible, quick, flapping, small, wiry, thready, irregular in time or in force, intermittent, reduplicated? Had the patient just eaten or drank food or stimulants, or undergone any exertion or excitement—a paroxysm of pain or a fit of coughing? The chart does not say. Well, it is the doctor's own fault if he does not also observe for himself. But I must direct you how to make your notes so that they will not be misleading. It is very easy to err in examining a child. In a previous lecture we have seen the normal rate and quality at the various ages. We have also seen that a little excitement will raise a child's pulse ten or twenty beats per minute. You may have to make several observations and then take the average. The child may refuse to let you hold his wrist long enough to count. It is of no use to force him—you would not get any accurate information if he is angry or crying. If he is an infant, feel the pulse at the anterior fontanelle. If he will not let you touch his head without a row, look at the fontanelle—you may see the pulsations. In a child not too fat you can see and count the throbs of the carotid, or perhaps he will let you play

with his foot, and you can feel the posterior tibial artery just back of the ankle bone on the inner side of the foot. Perhaps the pulse will be so rapid and confused that you cannot count it and will have to lay your ear over the heart. And you may find there are more heart-beats than pulsations at the wrist, in certain conditions. Learn to distinguish the various qualities of the pulse, even though you do not study all the pathological meaning they convey to the doctor. But you will be able to distinguish changes in the quality and notify the medical attendant that the pulse is growing weaker as well as more rapid, or has become compressible or has begun to intermit; that the heart stroke is failing to take place, or else not having force enough to send the impulse to the radial. You should know that if the fever temperature suddenly comes down while the pulse rate goes up, that your patient is in danger, and the doctor should be summoned to meet the crisis. So it is also if, in a lung case with rapid respiration, the pulse grows weaker, or the heart can be heard or felt laboring violently while the pulse intermits. If, in a case of rheumatism, the pulse rate increases out of proportion to the respiration, probably the heart has been attacked. In scarlatina an exceedingly rapid pulse is usual, even before the eruption appears. In acute inflammation above the diaphragm, as in lungs or brain, there is usually a full, bounding pulse, at least in the beginning. But if the trouble is below the diaphragm, as in peritonitis, there is the small wiry pulse. With the former, delirium may be present, while the latter may go on to death and the senses remain clear.

Temperature has been before alluded to in the lecture on physiology, but some further remarks will be necessary. The temperature is extremely mutable in infancy and childhood, being easily affected by causes that would have no influence on the adult. An indigestible meal may occasion a sudden and sharp attack of fever. Having seen how the body heat falls immediately after birth, it becomes obvious how necessary it is that the room should be warm where the birth takes place, that the nurse should promptly envelop the little stranger in the warmest of soft wraps, that the necessary bath should be in quite warm water, and the warm, loose clothing quickly adjusted. I sometimes say to a slow nurse, "Wash the eyes very carefully in clear water and then get through with the rest just as soon as possible." If I can't have both, I would rather have a quick bath than a clean bath for the new arrival. In testing the body temperature there are different ways of applying the thermometer. Children under four or five years do not hold it under the tongue very well. The most accurate way is in the rectum. A little oil or vaseline on the instrument will make it pass easily. Or the instrument may be placed in the axilla, unless the child is too thin. Really, the most convenient place with infants is in the fold of the groin, but if taken in groin or axilla it should be remembered to add about a degree to equal the rectal temperature. To place the thermometer in the fold under the chin is not very satisfactory. If the child is irritable and much disturbed by waiting for the mercury to adjust itself, it may be wise not to insist on waiting for the

last fraction of a degree. A quick-acting thermometer is a great convenience in working with children. Watch and see that the mercury has risen as high as it is going, then read it off.

At the outset of a fever, when an adult would be apt to have a chill, a child, particularly a young child, may have a convulsion instead. A child in a chill does not shake and chatter his teeth; he may shiver some, but his lips and skin and nails become livid.

In regard to the probable outcome of fevers in general, it may be said that children bear fever—continued fever—better than adults, without exhaustion. As to predicting the length of a fever, there is some truth in the old adage, "Long foretold, long last; short warning, soon past." But although soon past, it may, like a sudden storm, do a great deal of damage in the passing. Witness **scarlet-fever,** than which no fever comes more suddenly. A child may be well enough to go to school in the morning, and all in an hour be taken with vomiting, convulsions, and go into a high fever (102, 103, 104 degrees), with thirst and sore throat and the quick pulse before mentioned. Twenty-four hours later the bright red fine eruption, coming first on the throat and then spreading over body and limbs, settles the diagnosis of scarlet-fever. But the fever does not go down when the eruption is out. It lingers on a few days or a week, even where all goes well, till the eruption fades and desquamation begins.

Measles begins more slowly, with coryza, cough, malaise and a gradually rising fever, till the fourth day, when the eruption comes out in darker red

spots, first on the face, then gradually extending. When the eruption is out the fever lessens, not to rise again unless some complication, perhaps bronchitis, pneumonia or croup supervenes.

Diphtheria gives very little indication in the way of fever of its coming or of its severity. A mild case of diphtheria or even an ordinary case of tonsilitis may show more fever than a severe or fatal case of diphtheria. The adherent false membrane, enlarged glands under the angle of the jaw, and depressed heart, tell the story better than the temperature.

In **typhoid-fever** the temperature rises slowly, by successive steps, during several days, but in children the onset may be more sudden than is usual in adults. The fever in the typhoid of children is more moderate than in adults, and the abdominal symptoms — diarrhea, tympanites (bloating), rose-colored spots — are apt to be very indefinite; while there may be considerable cough. There may be difficulty at the onset in distinguishing typhoid-fever from bronchitis, pneumonia, or tubercular meningitis. This latter is one of the insidious, slow "long foretold, long last" kind, and the end is only too generally fatal.

The temperature in **broncho-pneumonia** runs a variable course over a period of two to three weeks, zig-zagging across the chart in a very irregular manner, ending by lysis (gradually). In croupous pneumonia it rises in a steep curve for two to four days, stays up with very little remission for seven to ten days, coming down by crisis (suddenly). But in children the varieties of pneumonia are often not so definitely distinguished as in adults.

The rule in regard to watching for a rise of temperature after an **accident** or **operation** is even more imperative in the case of a child than in that of the adult, as children are very prone to septic infection and inflammation, and are especially apt to have their wounds attacked by scarlet-fever. In fact, it should be an invariable rule to test the temperature of a child immediately before any operation, for the coming of one of the eruptive fevers may be discovered and trouble avoided. In case of a discharging abscess, as of a purulent pleurisy which has been opened, a plugging of the opening could be detected almost as quickly and certainly by the rise of temperature as by looking at the drainage tube. In other words, attention to proper dressing and free drainage will save a fever.

As to reducing high temperature by the means which it is the office of the nurse to employ, I shall offer some suggestions later, under the subject of baths.

Loss of **appetite** is one of the first symptoms noticed, not only in disorders of the digestive organs, but in all febrile states; consequently, although digestive disturbances are among the commonest of ailments of children, it is not wise to jump to the conclusion if a child loses its appetite and perhaps has nausea, a furred tongue, a bad breath, that the primary trouble is indigestion or gastric catarrh. So, on the other hand, it is not proper to suppose, because the appetite is keen, that the child should be fed as much or as often as it desires. In cases of indigestion there may be actual hunger while the stomach is full of food. Nothing is more common than to feed or nurse the baby be-

cause it is crying, perhaps as often as every hour or half hour. Now, more than likely it is crying from pain produced by indigestion—possibly it is crying from thirst, which is seldom thought of by the mother or nurse—but suppose that the crying is from hunger, and the food recently taken is yet undigested. Is it going to help matters to introduce more undigested food into that stomach? Assuredly not. The trouble would only be aggravated thereby. If anything, the milk should be lessened in quantity, and the intervals of nursing most carefully regulated and probably medicines used besides. The same is true of older children. Indigestion is often the cause of the morbid appetite which makes them want "a piece" between meals, and the "piecing" only makes matters worse. The appetite does not always gauge the digestive power. A variable appetite is often present in the catarrhal state of the intestinal tract which harbors worms of various kinds, the round stomach worms, the little thread worms, or tape worm. A voracious appetite is one of the symptoms of that peculiar disease, tubercular meningitis.

Vomiting is a very common symptom, but it is not always, as is often supposed, a symptom of stomach disease. The center in the medulla which presides over vomiting may be irritated directly or indirectly. The irritant may be the poison of an infectious disease, such as scarlatina, small-pox, pneumonia, circulating in the blood; the poison may be formed in the system, as in uremia from kidney disease, or may be due to drugs, or emetics, or anesthetics. Vomiting may be due

to a fall or blow upon the head, to the motion of a cradle or swing, or merry-go-round or rail-car or boat. It may be due to disease of the brain itself or its meninges, or disease of the stomach itself; or be reflexed or "sympathetic" from one of the abdominal organs, as the peritoneum or kidney. Vomiting may be caused by incarcerated or strangulated hernia or any obstruction of the bowel, such as intussusception or telescoping of the bowel, a volvulus or twisting of a loop of bowel or any blocking of the intestinal canal. Vomiting may be caused by mechanical irritation of the throat, or by a paroxysm of coughing, as in whooping-cough or bronchitis.

Infants sometimes vomit from mere overloading of the stomach by nursing, without being ill and without any feeling of nausea—a mere spilling out of what is not needed—accompanied with none of the weakness or pallor or quickness of pulse or perspiration which accompany pathological vomiting. Infants and children vomit more easily than adults, owing to the stomach and esophagus being more in line and the circular muscles at the entrance of the stomach less resistant. Infants also vomit very forcibly, owing to the position of the stomach between solid organs, the liver, the spleen, and the supra-renal capsules.

In case of vomiting from an unknown cause, the nurse should at once think whether any poison could have been taken—any medicine or any food likely to cause it. How was the child engaged when the vomiting began? She should also note the quantity, odor and appearance of the vomited material, and if possible save it for the doctor's

inspection. Does it consist of soured or undigested food? Has it the odor of any drug, for instance, of phosphorus from the heads of matches; or of ammonia, as in uremic poisoning; or does it contain blood? If so, had the child's nose been bleeding previously, or had he had an accident, or been coughing? Does it have the odor or appearance of fecal matter, as in obstruction of the bowels; or of bile (which is green), as in violent or long-continued vomiting from any cause. Does it seem to contain pus (which is rare); or mucus (which is common, especially in stomach disease); or the mucus may have been coughed up and swallowed till the stomach is irritated by its presence; or is it profuse and watery, as in dilatation of the stomach and the beginning of cholera infantum?

If you judge the child is vomiting from the presence in the stomach of something which were better out, such as a quantity of undigested food, it is well to give large draughts of warm water and let it come out, and so clear and wash the stomach. If the stomach is clear, and retching continues, it is usually safe to give bits of ice at intervals of a few minutes, or teaspoonful doses of hot water, or to apply a mild sinapism or a spice plaster over the stomach till the doctor prescribes or gives orders. Perfect quiet and pure air are always in order, and are the best of remedies for the vomiting which follows anesthesia.

You should become familiar with the appearance of the **abdomen** in childhood, and report to the doctor any deviation from the normal. In the new-born infant there may be inflammation at the

umbilicus, or hemorrhage, or polypoid growths, or a patent urachus there; and either in the newborn or older child there may be hernia at the inguinal, more rarely at the femoral openings. I have in the first lecture described the large size of the abdomen, the large liver and various peculiarities of the abdominal and pelvic organs; with these you should be quite familiar.

Pain in the abdomen that is relieved by pressure is usually due to colic and will be still further relieved by warm applications. The pain of inflammation is generally aggravated by pressure, though it also may be somewhat relieved by heat. But pain persisting in the abdomen or accompanied by tenderness on pressure should receive early attention from the doctor, as many dangerous disorders, appendicitis, twists and telescoping of intestines, internal hernias and other obstructions are only too frequent; besides spinal disease and gravel, the pain of which is frequently referred to the abdomen. If constipation is present with the colic, a copious enema of quite warm soapy water is often useful; as is also massage, by the nurse's hand well warmed and working in the direction which should be traversed by the contents of the colon—up on the right side, across the upper portion of the abdomen and down on the left side. It should never be forgotten, in case of pain apparently abdominal, that children are subject to **retention of urine,** which occasions excruciating distress. More than once I have seen a child fussed over for hours or even days under the supposition that it was suffering with colic, when a single glance at the abdomen, with its tender globular swelling above the os pu-

bis, should have told any one that the bladder was distended, and only to be relieved by the catheter. The knowledge that the child has not passed water within the proper time, besides being in pain, should have led to the calling of the doctor and the passing of a catheter.

The abdomen of the child in health appears too large to one unaccustomed to examining children; but in some diseases, for instance rickets, the great belly, scarcely supported by a pair of small, perhaps crooked and skinny legs, and surmounted by an insignificant chest and a large head, is fairly comical to behold. The abdomen is sometimes enlarged by diseased mesenteric glands, sometimes by dropsy, as in adults.

The normal condition of the **urinary organs** has been described in our second lecture, and any departure from the normal in amount or color of the urine, in the frequency of micturition, or any difficulty or pain in retaining or in passing it, should be noted and reported.

The urine gives valuable information, not only of the state of the urinary organs themselves, but also of the circulatory. For instance, the quantity fails in the failing circulation of heart disease, and dropsy supervenes, or grows worse if present before, and the end is imminent. The urine may also tell of a diseased liver, being stained yellow by the constituents of bile. The yellow stain of the urine upon the napkin of a new-born babe may tell the onset of icterus neonatorum (jaundice of the new-born) a day or two before it is announced by the yellowing of the skin.

The napkin may show considerable deposits of

white or pink matter. It should not be forgotten that children, even fetuses for that matter, can have gravel, and stone in the bladder is not uncommon. Stone in the bladder is more common in boys than girls because the small beginning of a concretion easily passes the female urethra. The symptoms of stone in the bladder are frequent urination, aggravated by motion, and somewhat relieved by lying quiet, and pain when passing water, or just after passing it. Pain may be severe enough to cause the child to dance about, crying and pulling at the organs with the hand. A little blood may pass after the urine.

There are malformations of the urinary organs too numerous and complicated to mention here, the nature of which will be discovered when any departure from the normal in such a case is reported to the doctor.

The same may be said of the **intestines and their excretions.** Never think it will be considered beneath the doctor's dignity to inspect the dejections. A glance may tell him more than your best description. Descriptions are apt to be misleading. One of the common errors is to say the stool was bloody or contained blood, when it was only mucus of a pink tinge. Another is to report the bowels as " quite regular," when in fact there is a quite constipated stool perhaps daily, but always inadequate and may be several days behind time. But if there really is blood or bloody water in the stool, prompt attention from the doctor is required. Bloody stools occur in dysentery (bloody-flux), which is an inflammation of the lower bowel, accompanied with fever and diarrhea. The

stools are frequent, passed with much straining, and consist largely of blood and mucus of most offensive odor. When it occurs in children it is a grave disease, worst in weaned infants and young children; very bad in epidemics. Sporadic cases are not so serious. A bloody passage occurring in the course of typhoid fever would be the result of hemorrhage from a typhoid ulcer in the small intestine. This is a very serious symptom. It is not so apt to occur in children as adults. The blood is not fluid when passed, but in clots.

Children are not apt to have hemorrhoids or bleeding piles, but they are a great deal more likely than adults to have intussusception or invagination of the bowel. This is a condition in which one portion of the bowel becomes "telescoped" into the next portion. And its occurrence is greatly favored by the active and irregular peristalsis and the long and loose mesentery we have before described. These anatomical and physiological peculiarities also favor the production of twist or volvulus, as well as internal or external hernia, and various forms of intestinal obstruction. If occurring suddenly, such an accident is accompanied with symptoms of shock, with paroxysmal pain, and if an intussusception, with bloody watery passages. It may occur more gradually, and I very much fear it is often overlooked, being mistaken for ordinary colic, or diarrhea, or constipation, or dysentery, or prolapse of the rectum, until help comes too late. It is a very grave condition, and requires early and skilled interference.

Prolapse of the rectum is very common. It is a

protrusion through the anus of the mucus lining, perhaps even of the muscular tissue of the rectum. It appears as a red ring at the anus, or may even protrude an inch or several inches, and be purple or nearly black from congestion. When discovered, the protrusion should be immediately bathed with water, and then returned within the rectum by pressure of the nurse's hand covered with a soft towel smeared with vaseline. Such a child should not be allowed to sit straining at stool but should lie upon his side and pass the motion upon a diaper, or if older use a bed pan. If constipated, or there is much tenesmus, an enema should be used. If the bowel still tends to protrude during defecation the nurse's hand placed upon one buttock should strain the skin across the anus so as to prevent it. The doctor should be notified of the condition at his next visit. He will search for the cause either in general weakness, perhaps following diarrhea or whooping cough, or in constipation, worms, or polypus, or some bladder or urethral trouble which occasions straining, and advise proper measures for cure.

Polypus, a vascular spongy growth from the mucus lining of the rectum, may occasion bleeding, often with straining and pain on defecation. It more frequently occurs in childhood and youth than during any other period of life. Pain *after* defecation points to fissure at the anus.

A child may pass worms from the bowel. They may be the round or stomach worms, which look like ordinary earth worms or angle worms; the thread worm or seat worm, like bits of white thread from half to an inch in length; or segments

of tape worm, looking like sections of yellowish white tape a quarter or half an inch in width and two or three times as long. The presence of worms may give rise to almost any symptom referable to the alimentary tract or to the functions of the nervous system, or they may occasion no symptoms at all. The passing of worms by the bowels (or their expulsion by vomiting) is about the only sure and unmistakable sign of their presence.

Pain and its location have been touched upon in speaking of the expression of the face, but there is more to be said. Children do not locate pain accurately, and those in charge should become adept at finding where it lurks. A child often refers a pain in the chest, for instance of pleurisy or pneumonia, or of pericarditis, to the region of the stomach.

Pain in the bowels is often indicative of spinal disease. In this case it is likely that the pain is really felt in the abdomen at the ends of the nerves coming from that portion of the spine affected. So also is the pain of hip-joint disease referred to the knee.

Pain in the stomach or the distress from an overloaded stomach is often referred to the chest behind the sternum or sometimes to the throat. The child may fail entirely to distinguish the location of a renal colic, which is in the region of the kidney and runs down the loin towards the bladder, from that of intestinal colic. He may affirm that his arm hurts when the injury is at the shoulder or collar bone and is only elicited by movements of the arm.

The **mouth** is well worthy of our observation. In harelip it unfortunately is only too conspicuous, and in congenital enlargement or diminution also. The habitually open mouth is scarcely less disagreeable. It is caused by some obstruction in the upper air passage — often enlarged tonsils, or post-nasal growths. Mouth breathing not only gives a very stupid appearance to the face, which is increased by the dullness of hearing often present in these cases, but it gives rise to a number of evil consequences of more importance than appearances, or than snoring during sleep, and requires the attention of the physician. The hard or soft palate may be cleft, that is, really partly absent.

Fissures of the lips have been referred to under congenital syphilis. You should become familiar with the appearance of the mouth inside as well as outside in health, the more readily to recognize any departure from the healthy standard. You would soon notice that a perfectly healthy infant may have, in fact generally does have, a white tongue, and you would soon learn to observe the vesicles or ulcers or white specks or patches that characterize certain forms of inflammation of the mouth.

The white specks of curdled milk in the mouth of a baby whose oral cavity is not cleaned as it should be, are not to be mistaken for thrush, or *vice versa*. Milk curds brush off easily, thrush patches are fast to the mucous membrane. Ulcers of the gums and fetid breath mark another form of stomatitis. Drooling and dribbling of saliva from the mouth is not always a symptom of teething, for it accompanies many of these inflammations of the mouth.

The **tonsils** may be chronically enlarged or acutely inflamed. If inflamed, it may be ordinary tonsilitis or quinsy, or diphtheria, or scarlatina. If the inflammatory redness extends beyond the tonsils themselves, or if there are one or more white, gray or yellow spots or patches in the throat, or any swelling of the glands at the angle of the jaw or neck, or constitutional disturbance, the doctor would best see the case without loss of time.

About the **tongue.** One is asked to inspect two or three dozen supposed cases of tongue-tie before he finds one that really needs cutting. A child that nurses properly can hardly be tongue-tied. A child that can place the tongue upon the lips is not tongue-tied, even though the frenum may be attached nearer the tip than ordinary. You can induce an infant to protrude its tongue by employing a little maneuver which Sir William Jenner thought it worth his while to practise and promulgate. Place a drop of molasses or glycerin on the baby's tongue, lip, or chin, and out comes the tongue. Thus not only its movements but its personal appearance can be inspected. The tongue looks too dry in all fevers. In the typhoid state it is quite dry and generally crusted over, as are also the teeth. In this condition frequent moistening with glycerin and water in almost any proportion are very comforting by maintaining moisture. The tongue is furred in the gastric catarrhs that accompany all feverish states. The precise appearances of the tongue and their significance in all conditions are too numerous to review here. Scarlatina gives a peculiar appearance

known as the strawberry tongue. The papillae are enlarged and make the tongue look like a white unripe strawberry, if it is covered with fur; or like a ripe red strawberry if it is bare of fur. It is more apt to be bare later in the disease. A bitten tongue, not otherwise accounted for, raises a suspicion of a convulsion having taken place, perhaps in the night or when no attendant was nigh.

It would require an hour's lecture to describe, even briefly, all that may be seen about the **teeth,** and we have only a few minutes left. A babe may be born with teeth, one or two, but is not necessarily to be congratulated on that account. If he gets the two lower central incisors at six or seven months he is doing well enough. The upper central and then the lateral incisors follow a few weeks later. The child should have sixteen teeth when he is two years old. There are twenty teeth in the first set and if they are not cut by the time he is two and a half years old he is probably rickety. So also if he has not the first by the time he is a year old. Teething is not to blame for all the evils that have been ascribed to it by puzzled diagnosticians, but it does sometimes give rise to troublesome symptoms, for instance pain, nervousness, even convulsions, fever with temperatures of 102°, 103°, 104° F. Skin symptoms, bronchitis, indigestion, and diarrhea are also apt to be coincident with teething. The popular opinion is that a child ought to have diarrhea while teething; but this and other disorders should be attended to just the same during teething as at any other period. The chest should be protected

from the drooling by a water-proof bib. The upper teeth are likely to cause more disturbance than the lower. It is true that the cutting of the "eye teeth" (the canines) may through their nervous connection affect the eyes, exciting a mucous discharge, and digestive troubles are more common during eruption of the " stomach teeth " (the lower molars). It happens that the digestive organs lower down are undergoing rapid development at the same time with the teeth. There may be symptoms such as headaches, palpitations, asthma, dizziness, etc., during the **second dentition,** which takes place in youth from the seventh year to puberty. The conformation of the permanent teeth may clearly indicate the hereditary syphilitic taint, but early decay does not signify anything more than poor constitution or much sickness, very seldom the use of strong medicines. Right here I wish to enter a protest against the popular fondness for attributing decay of the teeth to medicine that has been taken, and I hope you will help to correct that notion among the people. The truth is about this: In ninety-nine cases out of one hundred it is the disease and not the medicine that influenced the teeth, and in the hundredth case the medicine saved the life if it possibly damaged an already bad set of teeth.

Severe illness profoundly affects the nutrition. Everybody knows how the hair dies and falls out after some fevers, and we have seen how it and the skin grow harsh and ugly after others. Emaciation during illness is very commonly observed, and sometimes stunting of the growth and long delay of development in children. Even a

spell of sea-sickness may cause a groove across the finger nails that will be months in growing out. It is the fact that syphilis is active during their formative period, which produces the peculiar shaping of the teeth that is pathognomonic of hereditary lues. Then in the face of all these facts and many more that could be cited in illustration, why, in the name of common sense, do people attribute decay of the teeth after illness to the medicine and not to the disease? Why not say it is the medicine that causes the hair to fall out, or the bathing that causes the emaciation? The fact is that the nutrition of the teeth is affected as well as the nutrition of hair, skin, muscle, fat, bone, and every tissue in the body to some extent, some more than in others. Thus, their nutrition impaired and vitality lowered, they are liable to the effects of all the deleterious influences that may be brought to bear against them. If it happens that a tooth or a pair of teeth are in process of development at the time of a severe illness, when those teeth make their appearance they will likely be found ill-shapen and with a thin and rough coating of enamel of poor quality, and they will decay early; and very likely the doctor will be blamed for giving medicine that spoiled the teeth, or the nurse for the way she administered it.

LECTURE V.

NURSING AND GENERAL MANAGEMENT OF SICK CHILDREN.— OPIUM.— STIMULANTS.— TEA AND COFFEE.—BATHS.—NURSING IN VARIOUS DISEASES AND OPERATIONS.

NOW a few words about certain drugs. **Opium** and its derivatives are dangerous, very dangerous in infancy. Even when directed by the physician, their effects should be carefully watched. But it is against their use without the doctor's advice that I wish to warn you. You may not know that they are opiates, but only that it is "Grandmother Goody's Soothing Syrup" or "The Family Cough Cordial." I want to tell you that all the soothing syrups in the market contain opiates, no matter how much the advertisements deny it and profess their innocence. One sees their effects upon the organism. It is such a temptation when the baby is fretful, nervous, cross, wakeful, to give him a dose or two of some soothing compound and then soothe one's conscience with the thought that it is said to be harmless, and that it procured a sleep not only for the baby but for the nurse. Ah! what a lot of trouble these specious preparations do save the people from, for the hour, and what a world of trouble they do lead them into later on—derangement of the digestion and constipation, leading to the use

of a laxative which only increases the trouble; malnutrition, increased nervousness, insomnia and restlessness, that are only quieted by increased doses of the drug, and a perpetuation of the chain of evils. No honest observer can doubt that permanent damage to the nervous system follows the use of these concoctions. Having been warned of their evils, I trust none of you will ever be guilty of employing them. I have more than once been obliged to discharge a nurse who was smuggling soothing syrup into her little charge; and have sometimes wished I could discharge a careless or selfish mother who was procuring her own present ease at the cost of her child's health and welfare.

The **patent cough medicines** are not so apt to lead to the chronic disorders of the opium eater, for the reason that the patient is killed off sooner. In cases of bronchitis, for instance, when the little air tubes are nearly occluded with secretion and their sticky walls liable to adhere, cough is the greatest safeguard against complete closure to the passage of air. If in this condition you give a drug that so obtunds the sensibility as to suppress cough, you smother, or, if you prefer the term, you drown the patient. There are hundreds of little patients literally killed every year by cough mixtures. Never use anything of the kind except by advice of the doctor.

The use of **alcoholic drinks** is very deleterious to children. In some countries this practice is very common.

When the great out-door clinics of England issue printed directions for the care of children, it

is found necessary to include the rule that "beer or spirits should never be given to children," and one attending British clinics for children frequently sees the effects of alcohol.

Notwithstanding the alarming statements of the temperance agitators, this evil is comparatively unknown in this country. I recall but one case of *chronic* alcoholism in a young child (2½ years) seen in the United States.

On the other hand, the use of **tea** and **coffee** is only too common. It augurs ill for the abatement of prevalent and increasing nervous diseases in America that tea and coffee—really active drugs—are habitually used by many infants and children. Not only the nervous system but the alimentary organs suffer, and then come a train of evils in the wake of poor nutrition. Never give tea, coffee, or alcohol in any form to children as beverages.

Baths in sickness. More good can be accomplished by the use of baths in the sickness of children than with adults. This is because the skin of the child is thinner and more vascular and the temperature of the blood is more readily changed to the temperature of the bath; and because the nervous system is more easily affected by the action of the bath upon the peripheral nerves.

There is scarcely a form of acute disease that is not benefited by a warm bath at the onset, and many slight febrile and catarrhal attacks are completely aborted by the timely use of the bath at a comfortably warm temperature. The child is restless and unhappy, feverish and thirsty, with poor appetite and perhaps in pain. He is undressed and placed in a warm bath and the water kept up

to the proper temperature moving about him for 5 to 10 minutes. He is then quickly dried in a soft warm blanket and put to bed. It will usually be found that his fever is lower, his nervous system soothed, probably his pain abated, and he may go quietly to sleep.

In fevers of any kind, bathing is one of the most reliable means of reducing temperature. Here the general bath may be used, or more frequently sponging of the whole surface, a part at a time. The child may be left immersed in the bath from 2 to 5 or from 8 to 10 minutes, according to the temperature of the water and of the patient, and the effect sought after. The temperature of the water may be 90° in cases of convulsions without high fever; or it may be cool or even cold in fevers, at the direction of the physician. Sponging of fever patients should be done deliberately, not hurriedly. Tepid water is usually best, and to this can be added aqua ammonia a teaspoonful to a quart, or baking soda (not washing soda) one or two tablespoons, or alcohol in any proportion. A part of the body is sponged for a few minutes, then dried and covered, and another part uncovered and sponged. It is possible in this way to bring down the fever several degrees in the course of 20 or 30 minutes. A cloth or bunch of cotton can be used instead of a sponge, but nothing is quite as soft and comfortable as a sponge. There is no danger of sponging too much while the skin is hot and dry and the temperature is up. It is not necessary to worry and fatigue the patient by turning and handling during the sponging.

Irrigation with hot water, or if more agreeable

with cold water, is very efficacious in bruises and sprains. It is usually a good rule to use the water at the temperature which feels most agreeable to the patient, if old enough to express a preference.

A wet towel wrapped about a sprained wrist or sore throat and well covered with a dry, thick wrapping is often an excellent dressing.

The delicacy of the child's skin should be remembered in making **applications** of any kind. Mustard plaster should be made weaker by mixing with flour or linseed meal, and if made into paste with egg albumen it will not blister. Children are very impatient and irritable under the use of mustard plaster, and young children should not be subjected to it under ordinary circumstances.

Poultices (of which flaxseed meal makes the best) should be made with boiling water, should be very moist, and while they should be applied quite warm, great care should be used to avoid scalding. A poultice should always be covered with some air-tight covering, such as oiled silk or rubber tissue, or even oiled paper, and it is better to follow this with a layer of cotton batting. Four-fifths of the poulticing as ordinarily done is useless because the poultice is too dry or cold. If the flaxseed meal is complained of as too heavy it can be made light by mixing hops or chamomile with the meal before adding the hot water. The much-praised spongio-piline I have never found as good as a poultice, even when covered with oiled silk. Though it retains moisture it does not retain heat. But if spongio-piline or lint be dipped in hot water and applied, covered with oil cloth or rubber

sheeting and then a Japanese pocket stove laid atop, it makes an excellent and cleanly substitute for a poultice and avoids the odor of poultices, so disagreeable to some persons. Ordinary **liniments** and blistering fluids or plasters should be mitigated before being used upon a child's skin. In all your applications to the skin of a child, remember that it is as different from the skin of an adult as calf-skin is different from sole leather—as the upper is different from the sole of your shoe. For instance, in preparing a child for operation, do not attack the skin with stiff brush and strong antiseptic solutions, as you might that of some weather-tanned old sailor or grimy mill hand. Not but that asepsis is just as important or even more so (for the numerous and active lymphatics of the child make it very susceptible to septic absorption), but because milder means secure it. The antiseptic solution can be diluted a third or a half and a soft brush or piece of flannel used for friction. The child's skin is smooth and free from wrinkles and rugosities and is easily cleansed. Strong solution and harsh brush might even excite an inflammation of the skin, as one has seen before now. **Leeches** are not so much used as formerly, especially in this country, but you may be asked to apply them to a child, who will most likely be frightened at their appearance if you are injudicious enough to show them. Best apply them in a cone made of a folded napkin, or under a bunch of cotton, or under a small glass tumbler hidden with a towel. After leeching, a child should not be left long alone until all bleeding has stopped. It may persist undesirably and need firm pressure of the

nurse's finger, or a small compress of gauze or lint bandaged on to stop it.

Electricity.—The use of a battery, especially the Faradic current, usually frightens children and should be begun very cautiously and gently.

In case of paralysis or any low and lingering disease which requires a long time in bed, the greatest care should be used to prevent **excoriations and bedsores.** The parts pressed upon should be kept scrupulously clean and dry and relieved of pressure by circular cushions of rubber inflated with air or water and having a central opening, or by some other similar device. Paralysis also requires warmth.

The buttocks of an infant should be kept scrupulously clean and dry. Wet or soiled diapers should be changed immediately and the parts bathed. A child should not be left in a wet or soiled condition through the night, nor should a rubber diaper be applied outside the muslin or linen one. No diaper, when once soiled or wetted, should ever be applied again until it is first washed clean, thoroughly rinsed and dried. A drying powder of talc, or of talc and boric acid, or of lycopodium and oxid of zinc, equal parts, may be used about the buttocks, thighs and groins. A starchy powder or one that is readily made into a paste with water is useless.

You are aware that no **patient to be operated upon** must be sent to the table with any food in the stomach. I have before mentioned the importance, especially in children, of having the operating room warm and the patient so clothed as to protect him from cold during any operation under

anesthesia, and the bed warmed for his reception afterward. But in certain cases the **bed** will need more than ordinary preparation, for instance, in a case of lithotomy or of extroversion of the bladder. Here the bed must be prepared with a rubber sheet covered with a draw sheet, or else with a Kelly pad to receive and carry off the discharges. After lithotomy, the nurse must keep close watch for any hemorrhage, and see whether urine passes by the wound or the natural way; also, whether any particles of stone pass. In hiatus of the bladder, the greatest cleanliness will be necessary and the use either of protective salves or of constant irrigation, or both.

When making a dressing, for instance of an arm or leg, get the child's confidence by handling the well limb first, and always direct his attention by talking about his toys or anything you can invent at the moment. Always have at hand everything you are going to use so as to avoid laying down and picking up the limb unnecessarily. If a dressing is painful, do not be long about it. Children will often bear momentary pain bravely, but will break down if the pain is prolonged or repeated.

Bandaging and the **application of splints** upon children is indeed a fine art. Their limbs are often so round and soft, lacking the muscular and bony markings of later years, that your splints slip around or become loose. If you bandage tight enough to hold them you injure the soft tissues, interfere with the circulation, or excoriate the skin. The thoughtless or wilful restlessness of the child and carelessness in regard to wetting or

soiling the dressings add to the difficulty. Much skill, care and patience are necessary in keeping the dressings in proper position and condition. When splints or bandages are liable to be soiled or wetted they can be varnished with a solution of shellac in alcohol, which dries quickly. Perineal bands can be treated in the same way, but can often be substituted by a piece of rubber tubing. I have long been in the habit of replacing the leather straps of trusses for infants, and indeed all small children, with soft tubing of pure India rubber. They stand water, perspiration and urine, and if the truss be of celluloid there is nothing about it that can be injured or become hard or harsh.

Splints, braces and trusses, plaster jackets and bandages, should be frequently inspected to see that there is no chafing. The skin beneath their edges should be kept perfectly clean and powdered with equal parts of lycopodium and oxid of zinc, or powdered talc and boric acid, or similar dressing. Stuffing bits of absorbent cotton under only makes matters worse.

If you are going to **syringe a wound,** an abscess, or the ear of a child, show him first how the syringe works. Remember that a steady stream pains less than intermittent jets, though it may not cleanse so well. For the ear, a fountain is to be preferred to a bulb syringe. But the bulb syringe can be converted into a fountain by elevating the vessel containing the water after the syringe is filled. To **cleanse the eyes** thoroughly (for instance in purulent ophthalmia), it is necessary to control the child by force. This is best done by two per-

sons — nurse and assistant. You are seated and take the child's head, face upward, and top of the head toward you, between your knees. The assistant, seated facing you, holds the child's body on her lap and controls its hands. You thus have both hands free. With the thumb and index finger of one hand you press apart the eyelids, and with the other hand apply the nozzle of the fountain syringe; or, with pledgets of absorbent cotton dipped in water or a solution, you thoroughly cleanse the eyes, not merely outside but inside the lids.

A case of **harelip** and **cleft palate** involves much labor and attention on the part of the nurse. These are both natural deformities present at birth and may exist separately or together in the same child. Harelip is a gap in the upper lip a little to one side of the middle line, or in double harelip at both sides of the middle line. Cleft palate is a gap in the palate—from a mere notch in the uvula to entire absence of the roof of the mouth. In a case of any severity the child cannot nurse and must be fed with a spoon, preferably with milk drawn from the mother's breast. In the absence of this, with modified sterilized milk or other artificial food. Sometimes an infant which cannot nurse a small nipple can nurse a very large one, or a nipple with an obturator made to cover the gap in the palate. After operation for harelip, a child should be prevented from laughing, crying, nursing, or disturbing the dressings, or putting toys, etc., into his mouth. He should be fed fluids only, carefully, with a spoon. These rules apply also to cases operated upon for cleft palate. These

precautions should be carefully observed night and day for a week, unless the doctor finds firm union and chooses to be less strict in the management.

Diseases of the throat and chest are among the most frequent and alarming which afflict children. Not only are they subject to simple inflammations (as simple catarrhs of larynx and bronchiæ) which are likely to occlude their small air passages, but to certain spasmodic affections (as spasmodic croup), or diseases in which both inflammatory and spasmodic elements are combined (as whooping cough). Last and worst, certain infectious diseases (as pneumonia and diphtheria) afflict the air passages. A child may have a **tonsilitis** (a simple inflammation of the tonsils), from taking cold or disordered digestion or both combined. There will be slight feverishness, with soreness of the throat on swallowing, perhaps chilliness and headache. These symptoms, if slight, may disappear with the use of a hot mustard foot bath and a wet towel covered with oiled silk and a bandage, worn on the throat over night. If the symptoms are more than this it is better to consult a doctor.

Ordinary **croup** (spasmodic croup), or false croup, generally comes on suddenly — oftenest in the night. Some children are subject to repeated attacks. The child has a hoarse, dry cough (like the baying of a hound). It may have considerable difficulty in breathing, more on inspiration than on expiration. The first thing to do is to get the child into a room where the air is warm (70° to 80° F.) and moistened by steam. Then wring a large sponge or a large piece of flannel out of hot water and apply to the throat over the larynx. Give the

child a hot foot bath. This may relieve the croup sufficiently; but if not give an emetic. A teaspoonful of equal parts of powdered alum and sugar mixed, or a half to one teaspoonful of syrup of ipecac followed by drinks of warm water till vomiting is produced will usually end the attack for the night, and the child may sleep quietly till morning and be pretty well next day. But the disease may linger a little during next day and return next night. The child should be kept indoors in warm air all day, and if coughing, have small doses of ipecac and a dose of castor oil. The throat should be surrounded by flannel. If the breathing becomes spasmodic and cough hoarse next night more than the first, best see the doctor.

Membranous croup will be described under diphtheria. **Diphtheria** and membranous or diphtheritic croup are the most dreaded of all diseases of the air passages. As to the controversy over the identity or difference between diphtheria or diphtheritic croup and membranous croup, it need not take up our time at present. For our practical purpose it is best to regard them as identical, or at least to regard them both as exceedingly dangerous contagious diseases, differing more because of their location than because of much difference in their nature.

Diphtheria then is a contagious and infectious disease, characterized by inflammation with formation of false membrane upon the throat, nares, pharynx or larynx (or all of them), with implication of adjacent lymphatic glands, great general prostration, and albuminuria. The false membrane may form upon wounds, upon the skin

bared by a blister, or upon any raw surface or mucous membrane. It attacks a throat already diseased more readily than one perfectly sound and healthy.

The onset of diphtheria is rather slow and treacherous—malaise, chilliness, then some fever (not very much), headache, backache. The child may or may not complain of soreness of the throat at first. But perhaps even now the fauces are red and swollen and sore on swallowing and may show some spots or patches of false membrane. Then the glands at the angle of the jaw become inflamed, swollen, and tender, and opening the jaws is painful. The membrane may spread as described to all the mucous membranes, uvula and posterior nares. The breath is foul, sometimes very peculiarly and characteristically foul. The fever may run up but may not rule high at any time even in severe or fatal cases. Fever is not so important a symptom to watch in diphtheria as is the pulse. The pulse is apt to be rapid, weak and soft, on account of softening of the heart muscle. The urine contains albumin and sometimes other evidence of kidney disease. The disease lasts from four to twelve or fourteen days and may end in recovery; or death may come earlier or later in the disease because of toxemia (poisoning), in which case there is apt to be excessive enlargement of the glands about the neck, with great depression of strength and stupor. Death may come instantaneously by heart failure, even when the patient is considered convalescent. It may come by slower heart failure, by croup or by pneumonia. Diphtheritic paralysis may come during the sickness or

make its appearance three to five weeks after the attack. Perhaps the first indication of paralysis after diphtheria will be a nasal tone of voice, or a difficulty of swallowing, the fluid coming back through the nose; or there may be weakness in the muscles of the back or of the legs. The doctor being informed, will prescribe some medicine for the paralysis, but the nurse can do much to assist recovery by the attention to diet, general hygiene and massage, and usually with good hope of success.

The symptoms of diphtheria differ from those of simple tonsilitis or pharyngitis, by the presence of the false membrane, the swollen glands, and the constitutional symptoms. The membrane, variously called false membrane or pseudomembrane, found in diphtheria is composed of fibrin containing epithelial cells and leucocytes. It is white or grayish white or yellow or brownish or dirty gray or blackish, and looks something like wet sheepskin or a piece of water-soaked paper or pasteboard. At first it is firmly adherent to the mucous membrane beneath, and when torn off leaves a bleeding surface. After some days if the patient survives it becomes loosened and is coughed up. In tonsilitis there is sometimes an exudation which, at a glance, looks like the membranous patches of diphtheria, but this can be removed without bleeding. But in case there is the slightest doubt in regard to the nature of the disease a doctor should be summoned, as delays are exceedingly dangerous. One has often seen a life sacrificed for the sake of saving a doctor's fee, or because some self-confident nurse or mamma must try some recipe sent in by a neighbor or found in some book of

household medicine. Therefore I think it unwise to give you recipes unless for very simple and harmless things. There are too many points to be taken into consideration in the use of medicines. It is like handling edged tools. Therefore it is better to instruct those having in hand the nursing of children only as to the nature and symptoms of diseases in order that they may detect them and summon skillful aid, and in the art of caring for the sick—nursing proper.

Diphtheria differs from scarlet fever in that the latter is sudden in its onset, has high fever, quick pulse, an eruption, strawberry tongue, albuminuria (coming late in the disease), and desquamation, that is, a scaling of the skin. The symptom most similar in the two diseases is sore throat, this being usual also in scarlet fever; but the sore throat in scarlet fever does not usually have a membrane, though it may have a membrane that is not diphtheritic; or, true diphtheria may be added to a case of scarlet fever.

Diphtheritic croup (membranous croup) may come on during or after an attack of diphtheria visible in the throat, in which case its nature is apt to be suspected from the start; or, it may be the first manifestation of disease, in which case it is sometimes mistaken for ordinary croup or a cold, and precious time is lost before proper treatment is instituted. This dreaded form of croup does not come on suddenly like ordinary spasmodic croup, but slowly and insidiously, like diphtheria. The cough may or may not be croupy and the voice hoarse at first, but if so, the hoarseness or the loud rasping sound is lost after a few hours or a few

days, and the voice becomes husky or whispering and the cough muffled and whistling. In croup coming on without previous illness, the child may not seem sick during the onset, but may be quite happy and playing about the house. But the breathing becomes difficult, gradually more and more so—difficult not only on inspiration but also on expiration. It is as if a hand were grasping the child's throat to strangle it. The child labors harder and harder to get breath, the accessory muscles of respiration being brought into play, and the air hisses in and out through the obstructed larynx. The spaces above the collar bones and beneath the ribs sink in at each inspiration. The child is frightened and looks around appealingly for help and tosses restlessly about. The nostrils dilate, and if the difficulty comes on suddenly the lips become blue or dusky. If the strangling is slower sometimes there is pallor instead of duskiness of the face. The child sinks with exhaustion while the skin pours perspiration and the heart struggles vainly. Then come coma and death.

This would be the course and termination in these diseases if untreated, but it is the duty of the doctor and the nurse to prevent these complications and this fatal termination, and deadly as the trouble is there is always a fighting chance to conquer.

There is perhaps no disease in which so much depends on treatment and care for the result as does diphtheria, and every case of diphtheria in a child means a fight. See to the ventilation of the sick room with special care in diphtheria, and indeed in all poisoning diseases. One of the most

important things in the management of this disease is to keep up the strength of the patient by proper nourishment and stimulants, and it is well if this is understood and the patient's strength husbanded from the beginning. You have read of Richard Harding Davis' "Mr. Van Bibber," of New York. He was beset by a gang of toughs. He remembered that a reformed prize-fighter had given him six cardinal rules to be followed in case of getting into a street fight. He had forgotten the first five rules, but the sixth one was to "strike first." He acted on the sixth rule and came off victorious. Now if you forget everything else I tell you about fighting diphtheria, don't forget that your main object is to sustain your patient, and in so doing "strike first,"—and then keep it up right through the whole battle. Don't wait till signs of exhaustion come on, but as soon as you know it is diphtheria you are dealing with begin to brace your patient up against it. The diet should be of the most nourishing kind but easily digested,—milk, beef juice, peptonized milk, liquid peptonoids, beef tea, chicken broth. The milk can be mixed with lime water three or four to one. Milk and eggs, custards, milk gruels can be used if preferred. These should be given at regular intervals and as often, not oftener, than they can be well digested. Alcoholic stimulants, whisky, brandy, wine, will probably be prescribed by the doctor, and you may be surprised at the quantity. A child with diphtheria will take enough whisky to make its father dead drunk and show no signs of intoxication. Dispense with no stingy hand the dose of grog ordered by the doctor, and give it with the great-

est regularity. Prepare the drink just when you are ready to administer it, do not pour or mix it and let it stand awhile. The stimulants should be mixed with water or milk. The food, the drink and the medicines and all the applications must be made unremittingly, by night as well as by day. Diphtheria never sleeps, and if the nurse does, it steals a march.

While the strength of the patient should be preserved in every possible way, this idea should not be carried so far as to omit spraying the throat because the patient objects and struggles to prevent it. Very often when the patient objects and will not be coaxed into allowing the throat to be sprayed it is because the work is awkwardly done, or the patient has found that objection causes it to be abandoned. In case the child is unruly and will not be coaxed into quiet submission, it is best to take hold of him in such a way as completely to control him and kindly but firmly do the work. Often when the child sees that notwithstanding his objections the application will be made just the same, he will submit without any trouble. To make ineffectual efforts to hold the child only worries and fatigues him. How to hold a child to have the throat examined or operated upon will be described under intubation. If it is necessary to clear out the nostrils, as is sometimes the case, the child can be held as for cleansing the eyes in purulent ophthalmia, or as for intubation. A submissive child can lie upon the side during irrigation of the nares. This can be done by holding the nozzle of a fountain syringe in either nostril while the mouth is held open. The water re-

turns by the opposite nostril. It is very important that the nose be kept free by syringing or by spraying with antiseptic alkaline solutions, or even by swabbing, or the use of probe or tweezers, as directed by the doctor. Cases of nasal diphtheria are especially likely to suffer from toxemia. To leave the nostrils stuffed up is to allow the child to poison itself. Oily applications generally afford some relief to the swollen glands, but coal oil, a favorite application among the laity, should not be used. It is apt to blister, and diphtheritic membrane will grow at the site of the blister.

If croup supervenes or threatens, the temperature of the room should be raised to 70° or 80° F., and the air moistened with steam from boiling water. The doctor should be notified of the new symptoms. The steam from slaking lime is very useful in these cases, and unless the room is very small, with a low ceiling, it is best to make a tent over the child's bed with a couple of sheets sewed together and laid over a framework of laths tied to the corner posts of the cot, or over a clothes-rack; or, a clothes-line may be stretched across the room to serve as a " ridge-pole " for the tent. A pail with a pint or two of hot water is placed under the edge of the tent, and a lump of unslaked lime the size of an egg is dropped into the water. The steam arises, and its warmth, moisture and alkalinity are very beneficial to the patient and harmless to the nurse. A fresh lump of lime can be placed in the water at intervals. Sometimes it is desirable to "steam up" constantly; again, intervals of half an hour or an hour are sufficient. It is well in order to prevent the child from being frightened

and also to see that it does not get too hot, to keep your head within the tent at least at first. If fresh lime cannot be obtained, slaked lime may be kept boiling in an open vessel of water, but this is not so good. But if the doctor directs the sumblimation of mercury, which is done by placing a powder of the drug over a spirit lamp until it volatilizes (a very valuable and powerful method of treatment), do not put your head under the tent. If you do inhale freely of the fumes you may get a sore mouth or lose the gold fillings out of your teeth or possibly the teeth themselves. But the drug will have none but the most beneficial effect upon the patient.

If it becomes necessary to **intubate** and you are asked **to hold the child** during the operation, you will proceed as follows. (The same position is useful in case the nose or throat of a child is to be inspected or treated, or perhaps the tonsils or a foreign body removed, or an operation for harelip performed): You seat the child on your lap with his back toward you. You reach in front of him and take his left wrist in your right hand and his right wrist in your left hand, cross his arms in front of him and so hold him. But sometimes the patient needs more support, or struggling, slides down under his own and the nurse's arms. The usual way to confine the arms for intubation and similar operations is to envelop the child in a shawl or blanket and pin it tightly around the neck and across breast or back. But this, if tight enough to confine the arms, interferes with the movements of the chest in breathing, generally laborious enough already; and where tight at the

neck it is in the way in case a sudden resort to tracheotomy becomes necessary. I have found it better to control the hands by pinning each end of a towel around each arm, forearm and hand, catching the sleeve also in the pin. The towel is stretched across the back and thighs of the little patient and holds each hand down near the thigh of the same side. He is sitting or lying on that portion of the towel which holds his hands. This binder does not interfere with his breathing and leaves his throat bare.

The only management belonging exclusively to intubated cases is that everything taken into the stomach should be liquid or semi-liquid, and that everything should be taken with the patient's head lower than his body. You must understand that the tube left in the throat is standing upright in the larynx in such a way that the epiglottis cannot be entirely closed. If food or drink be swallowed while in the upright position a portion of it may drop into the open tube or be drawn there by inspiration, and so into the trachea and occasion strangling, or if not immediate strangling, inflammation of lungs or bronchiæ. So it is best to place the patient with his head down hill, lower than his body, when food, drink or medicine is given. It will then be seized by the muscles of deglutition and carried into the esophagus and so on into the stomach.

The nourishment, stimulants, medicines, inhalation are to be kept up just as carefully after intubation as before. Intubation is only a surgical or mechanical means of preventing suffocation till other means can conquer the diseased action. The

same may be said of tracheotomy. But the nursing of a tracheotomy case is an anxious and exacting piece of work. With intubation the nurse has nothing to do with keeping the tube in place or with keeping its lumen clear. She would not be expected to remove it if it became obstructed nor to replace it if it were coughed out. In case of either of these occurrences she should immediately call the doctor.

But with a tracheotomy case all is quite different. The patient need not have the head lowered when anything is given to be swallowed. The tracheotomy tube opens in front outside and not within the throat, so there is no danger of food getting into it in swallowing. But watch must be kept every moment to clear the tube if it becomes obstructed by pieces of membrane or strings of mucus being coughed up into it. The nurse must be provided with a number of feathers (the primary feathers from a chicken's or pigeon's wing are good) with which to clear the tube from time to time. The feather is pushed through the tube and twirled round so as to entangle the mucus or piece of membrane and then drawn out. She should also have a sponge and pair of tweezers or small forceps, and when, as the child coughs during the expulsive effort, a plug of mucus or membrane is forced up the trachea into view, it should be quickly caught by sponge or forceps and removed. In case of foreign body in the trachea which has not been removed, being fastened perhaps in a bronchus or lodged at the bottom of the trachea, sometimes the tracheotomy wound is tied open and a faithful nurse is set to watch

and to seize the offender the instant it flies up into the wound, before the inspiratory current draws it in again. At intervals the inner tube of the tracheotomy tube must be removed and cleaned. One of the small brushes used for cleaning nursing bottle tubes is convenient for this purpose. The tube is then oiled and re-introduced. The outer tube is not removed by the nurse unless suddenly and entirely obstructed, a rare occurrence. This should not be attempted unless there is a dilator or a small inner tube at hand to take the place temporarily of the one removed. This would indeed be a very trying ordeal for the nurse's nerves. I repeat, a tracheotomy case must be watched every moment. A moment's absence or inattention or a little clumsiness on the part of the nurse in cleaning the tube may cost the patient's life. If drink is regurgitated through the nose instead of being swallowed, it indicates paralysis, and if sufficient cannot be swallowed, resort should be had to rectal feeding or to passing food through a tube into the stomach. The nurse may have to learn to introduce a soft rubber tube down the throat or through one nostril, into the esophagus, and by means of a funnel pour the fluid through it into the stomach.

Diphtheria is a **contagious disease.** Its germs can remain active, no one knows how long, and can be carried in or upon clothing, furniture, spoons and dishes, toys, food, milk. It can be carried upon the feet, feathers or fur, or the throats of domestic animals—chickens, cats and dogs. It can be carried unconsciously upon the hands, clothing or throats of attendants or other members of the

household. It can remain in the room occupied by the patient, upon the floors, walls, casements, and poison people after the present case is all over and done. Therefore, besides what is done for the patient's own benefit there is much to be done by way of preventing the extension of the disease to others. These statements are true not only in regard to diphtheria, but also of scarlatina, small-pox and likewise of measles in case it is thought necessary to take strict precautions to prevent the spread.

The poison of scarlet fever may remain dormant for months or years and then, finding favorable soil, produce the disease.

The **infectious fevers** are not all catching to the same degree, nor propagated principally in the same manner. For instance, the poison of diphtheria is given off most in the breath and discharges from throat and nose; that of scarlet fever not only by the breath and discharges from nose and mouth, but by the skin; whooping-cough by the breath and probably by sputa; typhoid and cholera by the discharges from the bowels. The contagion from small-pox seems to exist in all the discharges and to emanate from all parts of the body.

Measles and whooping-cough are considered to be contagious from the beginning of the disease, while scarlet fever is not very infectious until the throat symptoms or the rash appear, though it retains its contagiousness as long as there is any scaling of the skin, even after the patient seems entirely well. The poisons of measles and small-pox seem to be very readily carried in the air,

more readily than those of scarlet fever and diphtheria, so that it is harder to prevent the spread of the two former than the two latter diseases by isolation. The following rules will apply also to other contagious diseases as well as diphtheria:

As soon as the contagious nature of the disease is discovered the patient should be isolated. A room should be selected on the upper floor of the house, if possible, which can be properly lighted, heated and ventilated, and is as far separated as may be from the rest of the rooms. An open fire is a great advantage for ventilation and for cremation of soiled things. From the sick room the carpets, pictures, draperies and all unnecessary furniture should be removed. What remains should be of the simplest—a cot, a stand, a chair or two (not upholstered). The curtains should be such as can afterward be either boiled, burned or fumigated. Articles, as dishes, spoons, etc., which are used in the sick room should not be again mixed with others in the house until disinfected. Only such toys should be brought into the sick room as will afterward be boiled or burned. The greatest cleanliness should be observed about the clothing and bed of the patient. Pieces of old muslin or linen used as handkerchiefs should be immediately burned. If short of old stuff, cheesecloth is cheap, and tissue paper or Japanese paper napkins answer pretty well. All bed clothing, body clothing and towels that come in contact with the patient should, on changing, be subjected to soaking for an hour in a solution of corrosive sublimate 1 to 1,000, and then to prolonged boiling and exposure to the air. The clothing of the nurse should

be treated the same way. It is well to have a sheet hung in the doorway. This, and also the floor, can be sprinkled occasionally with chlorides or carbolated (1–20) or sublimated water (1-1,000). The dejections should also be received in such a solution and at once removed. The following mixture is very useful and grateful, especially in vile-smelling cases of diphtheria and small-pox:

℞—Carbolic acid,
Oil of eucalyptus, āā ʒj
Oil of cinnamon, ʒij
Spts. of turpentine, ʒviij—M.

Two tablespoonfulls of this should be poured upon a quart of hot water in a pot or wide tin basin and kept constantly simmering in the sick room. It will improve the odor greatly and doubtless improve the quality of the air to some degree. No person should go back and forth from the sick room to other parts of the house. It is well to receive all dejections of all contagious cases in a solution of corrosive chlorid of mercury 1 to 1,000. A convenient way is to have a supply of a solution of the strength of 1 to 50. A fluid ounce of this in a pint of water makes a solution of about 1 to 1,000. This should be used for the purposes mentioned, and also for the nurse to lave her hands before taking her meals. The nurse should avoid inhaling the breath of contagious throat cases or allowing the patient to cough in her face; but in this country it would hardly do, at least in private practice, to be holding a pane of glass before one's face or wearing a respirator whenever spraying or making other applications to nose or throat. Nor are such precautions usually necessary. The nurse

should take her meals and her rest as regularly as possible, and should have a walk (even if only a short one) in the open air every day. When the case is at an end, either by recovery or death of the patient, the room and everything in it must be disinfected. If fully recovered, the patient gets a final bath and a complete suit of clean clothes, and is dismissed from the sick room. Anything in the room that can be spared should be burned. The furniture should be scrubbed thoroughly with hot solution of bichlorid of mercury (1–1,000). Also the floor. Doubtless the cracks in the floor harbor many germs. During the sickness I have sometimes had newspapers spread around the bed like rugs and then, after a day, burned and replaced by fresh ones. The casements and all woodwork in the room should be scrubbed with hot soap and water and antiseptic solutions. Brass work around fire-places, or brass or plated door knobs, should be scrubbed with carbolic solution and then coated with oil or grease to protect them from the fumigation which is to follow. Before the fumigation, everything that could not be soaked or boiled, for instance a mattress (though 'twere better burned), should be laid so as to expose all its surfaces. Fumigation is done by burning sulphur, and to be effectual two pounds of sulphur should be burned for every thousand cubic feet of space to be disinfected, and it should be burned in the presence of moisture. The best way is this: Any cracks about doors or windows of the room are tightly caulked, or strips of paper are pasted over them; and if there is a fire-place, the flue is stuffed full. A tub is placed in the middle of the

room or rooms if there are several together. Five or six inches of water are in the tub, also three bricks upon which is placed an iron pot. The pot should be *partly in the water*. The sulphur is put in the pot. A little alcohol or coal oil or turpentine is poured on the sulphur to make it light readily. It is lighted and left behind closed doors for a half day or a whole day. Then doors and windows are thrown wide open for another half or whole day or night.

Gasoline is a good disinfectant and can be used even on woolen clothing, carpets, etc., by thorough sprinkling, or better, pouring. This should be done in the open air and in the absence of any artificial light, on account of the dangerously explosive character of the gasoline. The vapor of formalin is a powerful disinfectant, considered by some to be the most efficient yet discovered. It is best used by placing the goods to be disinfected in a tight chest or trunk, as small as will contain them, together with an ounce or two of formalin poured upon a sponge or absorbent cotton. The formalin is preferably placed at the bottom of the chest, as the vapor rises. The lid is tightly closed and left for some hours. Clothing will require free airing after the formalin, the fumes of which are very persistent, pungent and irritating to eyes and nose.*

All **disinfecting lotions and materials** should be labeled poison and carefully kept separate from medicines and out of reach of children, for fear of distressing accidents.

*Since writing the above a plan has been proposed for disinfecting rooms and their contents with formaldehyd, by means of a lamp. It is hoped that upon extended trial this plan will prove more thoroughly destructive of germs and convenient for use than any hitherto employed.

The nursing of **bronchitis** and **pneumonia** are much like that of ordinary croup, so far as the temperature and moisture of the air are concerned. Poultices also may be directed. You remember some hints on poultices under the head of local applications. It is very necessary in these diseases to change your poultices without chilling the little patient. The fresh poultice should be all ready and put on immediately after the old one is removed. The clothing should be so loose as not to need removal, but should be merely raised up from below in effecting this change.

Chest poultices should be covered with an **impervious jacket,** which is usually made of oiled silk. It should be sleeveless, and without opening either in front or behind. It should be large enough to be raised from below without removal when changing poultices or examining the chest. It is easily made as follows: Take a piece of oiled silk and lay upon it one of the child's shirts, with the neck of the shirt at the middle of the oiled silk. Fold the oiled silk down over the shirt, which latter can be easily seen through the transparent silk. Cut a slit for the neck and do not round it out much, as you do not want a low-necked jacket. Cut a slit from the neck across one shoulder. Place the oiled silk upon the child and sew shut the slit over the shoulder. Then sew the seams down the sides, leaving an opening for each arm, and the garment is done. Do not be afraid of having the jacket too large. It should come down to the abdomen and be very wide and loose. No matter if it is twice as wide as the shirt. Sometimes the physician will not advise poultices, but a thick layer of cot-

ton batting, front and back, under the oiled silk jacket, the skin to be anointed with camphorated oil, or turpentine and lard (1 to 2). Some physicians never use poultices, but water compresses, hot, cool or cold; but these latter should only be employed in cases selected by the physician.

In nursing **whooping-cough**, if more attention were paid to warming and moistening the air as carefully as in the other diseases of the respiratory tract, we should have fewer cases of pneumonia and croup supervening on whooping-cough. It is essential to have a plenty of pure air, and doubtless this has led to the practice of some in advising these patients to stay out of doors constantly. But although it is necessary that the air be pure it is also necessary that it be properly tempered. The child should not go out if it is at all inclement. It is a great advantage if the patient with whooping-cough can be changed from one room to another while the vacated room undergoes a thorough fumigation with sulphur, and an airing. When it is again suitably warmed the patient can be returned to it and the other room purified and ventilated.

Running, laughing and crying should be restricted, as they excite cough. Where the paroxysm of coughing leads to the vomiting of food, liquid food, as milk or beef tea should be given after each paroxysm, to be absorbed before another comes.

In **pleurisy with empyema** (matter in the chest), there may be a long fight against hectic fever and exhaustion, and the nourishment should be very faithfully looked after. It is usual for the doctor

to remove the matter, either by aspiration (with a hollow needle) or by incision and drainage tubes. After operation (at which time a large amount of pus may be caught in a basin as it escapes), large absorbent dressings will be required to catch what flows. The nurse should watch the temperature, as a rise is an indication that probably the drainage tube is blocked by flakes of pus or by pressure of the dressing, which will need attention. The tubes should be cleared; but syringing through the tubes for this purpose should not be attempted by the nurse without the doctor's advice.

Scarlet fever is one of the dreadful diseases of children. Its onset is sudden, with vomiting, sometimes convulsions, high fever, rapid pulse, sore throat, strawberry tongue. It has a fine bright scarlet eruption, which comes out usually within twenty-four hours after the onset, and a desquamation (scaling of the scarf skin), which follows after the eruption disappears. The mucous membranes and the tubules of the kidneys are affected simultaneously with the skin, and also desquamate. The kidney complications are those most dreaded in scarlet fever; and the danger of their coming is not past until the skin has desquamated and been renewed. This may be weeks after the severity of the attack is past. There are other complications, such as excessive inflammation of the throat with abscesses; sometimes sloughing of glandular and cellular tissues of the neck, leaving great ragged holes into the throat through the rotten tissues under the jaw. There may be inflammations of joints with serous effusions (the so-called scarlatinal rheumatism), or inflammations

with effusions in other serous cavities (for instance the pleuræ). These serous effusions are apt to become purulent. All inflammations during or following scarlet fever are prone to develop pus. The ear, especially the middle ear (the portion between the ear drum and the Eustachian tube, which leads to the throat), is very commonly inflamed and suppurates. The drum may be perforated. Inflammation may extend deeper in toward the brain, forming an abscess, causing death or very serious damage. There are other complications and sequelæ of scarlatina, but these are the most common. No disease is so likely as scarlet fever to leave an unwelcome "keepsake" behind it. You may notice that I use, sometimes the name scarlet fever, and again scarlatina. They are synonymous. A great amount of sickness, suffering and sorrow has been caused by supposing that a mild case "wasn't real scarlet fever but was only scarlatina." Any case of scarlatina is scarlet fever. "Surgical scarlatina," which is apt to attack wounds, and sometimes go through a whole surgical ward, is scarlet fever. There is no other disease which presents so many degrees and varieties of severity. Its virulence varies in different epidemics, and in different cases in the same epidemic. It may be so mild as to pass undetected until inflammation of the kidneys reveals the nature of the previous disease. There may be no sore throat, there may be no eruption, there may be but slight fever, but it is scarlet fever. A "mild case" may prove fatal in the end. A mild case may give it to another that may have it severely. Scarlet fever is never to be trusted. All

cases of scarlet fever are to be isolated, and all the precautions in regard to quarantine and disinfection directed in case of diphtheria are to be observed. The room is to be carefully ventilated and kept at a temperature of 68° to 70°. It is the commonest mistake to keep rooms too warm in fevers, particularly the eruptive fevers, under the impression that heat is necessary to "bring the rash out" or to keep it out. Comfortable warmth is necessary, and chilling of the surface (by drafts or in other ways) is to be carefully avoided; but excessive warmth is depressing. The child should be kept in bed, no matter how mild the case. The milk diet is the best in scarlatina. Meat and eggs are not advised, as causing too much work for the kidneys. Blanc manges, porridges, jellies and the like are allowed. Water is allowed. Do not ever be guilty of the atrocity of denying water, cold water, to children with fevers, scarlet or any other kind. I do not say, give a child a whole tumbler full of ice water at a time, but just a little cool water at a time, and often, even if every few minutes. Small bits of ice are very grateful when the throat is bad in scarlet fever (or diphtheria). An important part of the nurse's duty in scarlet fever is **sponging the skin**—the whole surface of the skin—with tepid water. To the water may be added alcohol in any proportion, especially if the eruption does not come out well, or the patient is very restless; or aqua ammonia may be added, a teaspoonful to the quart of water, especially if there is much weakness. Continued use of ammonia may irritate the skin or make it harsh. Baking soda in the water does nicely, especially dur-

ing desquamation. Soap is also very useful during the scaling process. Plain water will do. The sponging should be done at least twice a day through the sickness and desquamation, and in high fever very much oftener. It reduces fever both directly by cooling the blood and also through the effect on the nervous system. The sore and itching skin is soothed and restlessness relieved and sleep induced by sponging. Besides, bathing removes the poison of the disease which is present in the scales which fall from the skin, and so is antiseptic. After the skin is bathed it should be anointed. The doctor will prescribe something for this purpose, probably olive oil or vaseline carbolized, one or two per cent, or oil of olives and of eucalyptus together. This should be rubbed with the hand over the entire skin. This soothes and protects the irritable skin. It protects against taking cold. It is a disinfectant by destroying the poison and also by preventing the dry scales of the skin from being carried by the air. The throat may need spraying. Hints in regard to this were given under diphtheria. The ears and nose may need cleansing. Directions may be found in previous sections.

The quantity of urine passed is to be observed and a clean specimen kept in a clean bottle for the doctor's daily examination. Any diminution or sudden suppression of the urine is to be reported to the doctor forthwith. If noticeably diminished in quantity, you will place a large hot flaxseed poultice across the patient's kidneys; and if suppressed, you will get him into a warm bath, followed by warm blankets. If too large to place in

a bath, you will envelop him in a blanket wrung from very warm water and dry blankets outside. Thus give him a " hot wet pack " for a length of time suitable for a bath. Follow with dry blankets. If the rash suddenly disappears, a warm bath and a rub with alcohol or dry mustard may bring it out. All cases of scarlet fever must be kept in bed for several weeks and are better kept there till the skin has desquamated and been renewed, if it takes six weeks or more.

Measles is a slower and less violent disease in its onset than scarlet fever. It begins with symptoms like a cold in the head, viz., red eyes, a running nose, a cough which increases, a fever increasing till the fourth day, when the rash begins to come out. The rash begins on the face, in spots and blotches, darker red than scarlet fever. The eyes may be quite inflamed, the cough very troublesome—continuous, dry, teasing. The eruption spreads over body and limbs. When it is out a day or so, the fever falls considerably.

There may be bronchitis or pneumonia with measles. Sometimes croup, very bad croup, follows measles.

Diseases of the respiratory tract are as much to be expected and guarded against in measles as are diseases of the kidneys in scarlet fever. The temperature of the room is to be carefully watched and all chilling avoided. Remember the remarks about overheating rooms. I was once called to see a child a year old with convulsions. There was measles in the next house, and measles was expected in this case. (Convulsions are not a common symptom of the onset of measles, but

more usual in scarlet fever.) I found the babe in a room so hot I was nearly suffocated when I entered the door, which was promptly closed behind me. The babe was lying on a feather tick in the bottom of a cradle with high board sides, and had a big feather pillow on top of it. I touched the baby's head and burned my hand. I applied the thermometer and found the temperature 108 in the groin, the highest I ever saw. I ordered the windows opened and the child released from its oven and sponged with tepid water. I dared not say cool water. The people refused, for fear it would "take cold." They were dosing it with hot saffron tea, "to make the measles come out." Maybe the measles would have come out after a while. But while I was telling the folks a thing or two the child took another spasm and died.

The frequent sponging and anointing are not so imperative in measles as in scarlatina, unless the fever is very high or the skin very irritable, but they will be found very useful and comfortable. If there is much cough or bronchitis, or pneumonia supervene, proper warming and moistening of the air, as directed under diseases of the air passages, should be remembered. Poultices or cotton batting under oiled silk may be ordered. The diet is that of fevers generally. On account of the inflamed eyes the room is kept darkened. It is not customary to attempt to isolate cases of measles and limit the spread of the disease, though it would be perfectly proper to do so. It should be done if there is a consumptive tendency in the family, as measles strongly predisposes to all lung

diseases, and fairly paves the way for the manifestation of tuberculosis.

Chicken-pox is usually a mild disease, and requires no special care beyond a simple anti-febrile mixture and light diet for a few days. The child may be indisposed for a few days before the eruption comes out, or the eruption may be the first thing noticed. The eruption is a pimple which in a few hours becomes a vesicle or blister, spherical in shape and filled with clear fluid. A red areola develops around the vesicle, which dries up into a scab and falls off. There may be only a few, or several dozens of such lesions, mostly on the back and body, but a few on face, scalp and limbs. They generally do not leave a scar unless scratched. They may be quite sore or itching and require some soothing application, such as carbolized oil or vaseline or oxid of zinc ointment.

Typhoid fever in children does not require very different nursing from what it does in adults. Here, as in diphtheria, the greatest care should be taken to administer nourishment and keep up the strength of the patient. Sponging will be employed to subdue fever. The dejections should be received in an antiseptic solution and promptly disposed of. For such a solution corrosive sublimate, 1 to 1,000, or a saturated solution of sulphate of iron (copperas) is efficient.

The typhoid fever patient should be encouraged to drink water. The diet is of the utmost importance. Nothing but fluids are allowed, usually milk, sometimes beef tea, mutton or chicken broth, unless there is much diarrhea. Some doctors allow thin arrowroot or rice water or eggs.

But the diet prescribed by the medical attendant should not be departed from in the slightest particular, no matter what the importunities of the patient or his friends. Peritonitis, or perforation of the bowel (almost certainly fatal), may be caused by a slight departure from this rule, and serious relapse is almost certain to follow it.

LECTURE VI.

ON "STERILIZING," "PASTEURIZING," AND "MODIFYING" MILK.—ARTIFICIAL FEEDING.—GENERAL REMARKS UPON THE DISPOSITIONS, HABITS AND MANAGEMENT OF CHILDREN.

YOU may be told to feed a baby "sterilized milk" or "pasteurized milk" or "modified milk," and you should know what these are and how to prepare them. **Sterilized milk** is milk which has been freed from germs and the "spores" or seeds of germs by subjecting it to a heat of 212 Fahrenheit for a period of forty-five minutes. This can be done by boiling, or preferably by steaming.

Pasteurized milk is milk which has been subjected to a heat of 167° Fahrenheit for thirty minutes. This amount of heat, while it does not kill all the spores, does kill the active germs, and so renders the milk little liable to change, and keeps it practically pure for a while before new germs have time to develop from spores which lived through the heat. Pasteurizing changes the taste of milk less than subjecting it to the boiling heat. Repeating the pasteurizing process (or boiling either, for that matter), under proper precautions for excluding the germs, at intervals of twenty-four hours, for three times would render the milk absolutely sterile, in which condition it could be kept sweet for weeks.

Modified milk is cow's milk whose component parts—as cream, albuminoids (sometimes called proteids or casein, the curd), water, sugar—have been changed from the proportions usual to the milk as taken from the cow. Milk is modified for the baby because cow's milk usually does not agree with him in all particulars until modification has made it more nearly resemble in its composition the natural food for the baby, viz., woman's milk. Woman's milk contains more fat, more sugar and less curd than cow's milk; besides being sterile and alkaline, which cow's milk as brought to our homes is not.

Milk is sometimes used modified and not sterilized, or sterilized or pasteurized without modification.

The doctor may order the milk modified in various proportions, and perhaps also sterilized or pasteurized to suit his ideas of the needs of that particular baby, and you should know how to prepare it, following his formula. For the sake of instructing you, we will take for example a common formula and go through the process. Ordinarily a steam sterilizer is employed. This is a vessel of tinplate or copper, arranged to hold seven or eight nursing bottles over boiling water while covered with a lid and outside jacket in such way as to retain the heat. Suppose the formula is:

To Make One Pint of Sterilized Modified Milk.

Take Cream,	3 ounces.
Milk,	2 "
Water,	10 "
Sugar of Milk,	6¾ drachms.
Lime Water,	1 ounce.

You will mix the cream, milk, water and sugar of milk (the sugar being first dissolved in the water) in a pitcher or other convenient receptacle, preferably of glass. You will then pour the mixture into the set of nursing bottles, an equal quantity in each bottle. You will carefully wipe the mouth and neck (inside) of each bottle and cork each with a generous wad of dry cotton twisted into the neck of the bottle. Place the bottles in the steamer and steam them thirty minutes at least—forty-five minutes will not harm. Remove the bottles and put in a cool place. (Be careful never to splash the milk against the cotton stoppers, which should be kept dry.)

For **Pasteurizing,** the steaming apparatus is not necessary, but a suitable thermometer is required and a rack to hold the bottles, immersed in water deep enough to come up as high as the milk in the bottles. The water is heated over a stove or lamp until the thermometer shows between 167° and 180° Fahrenheit, and kept at this temperature for thirty minutes. The steam sterilizer can be used for pasteurizing by guesswork, by steaming for fifteen minutes and then removing the jacket and setting the lid ajar for thirty minutes; but this is not as accurate a method.

On **using a bottle** of this milk it should be placed, bottle and all, in warm water and brought to blood heat, and a worsted cover slipped over it to maintain that heat; the cotton stopper removed and lime water, one-sixteenth part of the contents of the bottle, added. (The side of the bottle is marked and graduated so that one-sixteenth is easily ascertained.) Then place a carefully cleansed nipple

over the mouth of the bottle, and it is ready for the baby. The bottle should be held in the nurse's hand and given to the baby gradually during a period of twelve or fifteen minutes. When he has had his meal if any milk remains in the bottle it should not be used for the baby another time. One bottle should contain just enough for one feeding. The milk is usually prepared once in the day, enough being made to last the twenty-four hours. The formula here given to make one pint is only for an example. More or less can be made in the same proportions, according to the baby's need, and the proportions can be varied according to — but never without — the doctor's directions. Bottles and nipples should be kept scrupulously clean and sweet. It is well to place them, after use and cleaning, in a soda solution till wanted, when they should be carefully rinsed with boiled water before using again. The doctor will also direct what quantity to give at a feeding and how long the intervals should be. You will remember the lesson we had in the first lecture upon the capacity of stomachs at various ages.

In case you are left without definite instructions upon these points, or are expected to determine for yourself the **quantity and intervals** suitable for your little charge, you may be guided by the following table from Dr. Rotch. The day feedings are supposed to begin with the 6 A. M. feeding and to end with the 10 P. M. feeding. The babe is to have one feeding in the night till it is eight weeks old:

AGE.	Intervals, Hours.	Number of Feedings in 24 Hours.	Number of Night Feedings.	Amount at Each Feeding.		Total Amount in 24 Hours.	
				Cubic Centi-meters.	Ounc's.	Cubic Centi-meters.	Ounc's
1 week, ...	2	10	1	30	1	300	10
2 weeks, ...	2	10	1	45	1½	450	15
4 weeks, ...	2	9	1	75	2½	675	22½
6 weeks, ...	2½	8	1	90	3	720	24
8 weeks, ...	2½	8	1	100	3¼	840	28
3 months, . . .	2½	7	0	120	4	840	28
4 months, . . .	2½	7	0	135	4½	945	31½
5 months, . . .	3	6	0	165	5½	990	33
6 months, . . .	3	6	0	175	5¾	1035	34½
7 months, . . .	3	6	0	190	6¼	1125	37½
8 months, . . .	3	6	0	210	7	1260	42
9 months, . . .	3	6	0	210	7	1260	42
10 months, . . .	3	5	0	255	8½	1275	42½
11 months, . . .	3	5	0	265	8¾	1312	43¼
12 months, . . .	3	5	0	270	9	1350	45

Ssnitkin, of St. Petersburg, believed that the child's gastric capacity is in proportion to its weight rather than its age, and Seibert, of New York, has followed up this plan and devised feeding bottles in sets of different sizes, according to the child's weight. It is true that a baby large and heavy for his age may have greater stomach capacity than an older baby which is naturally smaller for his age. But a heavy baby may be mostly fat and have no larger internal organs than a lighter baby which is thinner. Gastric capacity is partly determined by the size of the individual infant, partly by the stage of its development, and partly by peculiarity of its individual conformation and organic activity. All tables and figures upon the subject are made from averages and are not far from the truth, but they leave the exact figure to be ascertained for the individual case.

The following is Seibert's table. The baby is to be weighed naked:

Weight in Pounds.	Number of Bottle.	Size of Bottle.	AMOUNT			TIME OF FEEDING.			
			Of Milk.	Of Gruel.	Of Sugar.	How Often.	In 24 Hours.	From 6 A. M. to 6 P. M.	From 6 P. M. to 6 A. M.
6, 7 and 8.	I	3 oz.	1 oz. or 2 tablespoonfuls.	2 oz. or 4 tablespoonfuls.	½ teaspoonful.	1 bottleful every 2 hours.	8	6	2
9 and 10.	II	4 oz.	1½ oz. or 3 tablespoonfuls.	2½ oz. or 5 tablespoonfuls.	½ teaspoonful.	1 bottleful every 2 hours.	8	6	2
11, 12, 13 and 14.	III	5 oz.	2½ oz. or 5 tablespoonfuls.	2½ oz. or 5 tablespoonfuls.	¾ teaspoonful.	1 bottleful every 2½ hours.	7	5	2
15 and 16.	IV	6 oz.	3½ oz. or 7 tablespoonfuls.	2½ oz. or 5 tablespoonfuls.	¾ teaspoonful.	1 bottleful every 2½ hours.	7	5	2
17 and 18.	V	7 oz.	5 oz. or 10 tablespoonfuls.	2 oz. or 4 tablespoonfuls.	1 teaspoonful.	1 bottleful every 3 hours.	6	5	1
19 and 20.	VI	8 oz.	All Milk and one teaspoonful of Sugar.			1 bottleful every 3 hours.	6	5	1

I will leave with you these slips containing directions for preparing various articles of food, etc., which I often find made in very haphazard and unsatisfactory ways. You can copy them into your note-books at your leisure*.

Before I close this too short, too condensed, and, as I very well know, imperfect course of lectures "About Children," I wish to give you some **general remarks upon the dispositions, habits and management of children.**

It was related of Thoreau, the New England naturalist and writer, that if he paused to rest during a ramble in the woods, the birds would perch near him or continue their songs or the building of their nests unabashed; and if there happened to be a snake nearby it would coil itself about his leg in the most friendly and familiar manner. All nature's children seemed to regard him as one of their number, merely a different variety of creature, but entirely in sympathy with them and their surroundings. Now if this story is true—and if you will promise not to laugh too much at me, I will acknowledge that I believe it—does it not show the power of sympathy, of knowledge and of tact in dealing with the little people of creation? **Sympathy, knowledge,** and **tact,** these are the coins with which to buy the love and confidence of human children, and when you have won these they will be your little slaves, as willing and obedient as fairies to the fairy queen, or genii to the magic talisman.

Will you pardon a personal incident in illustration? I visited an old school friend whom I had

* *See Appendix.*

not seen in a dozen years. I was a total stranger to the little daughter, aged four, but we were left alone together for a few minutes. The mother, returning, stood in the doorway with amazement to see the little one in my arms making the liveliest demonstrations of childish affection. "Why," said the mother, "I never knew her to make up to anybody, she is so shy and peculiar in that way. Her own father would have to coax, not always successfully, for a kiss. How do you do it?" I could not tell her exactly, and I cannot tell you. There are some things that can be described; others you will learn by yourselves. But if children habitually fear and avoid you, there is something wrong with you and you would better look to it. One cardinal rule is this: Never seem in haste to make acquaintance with a child. Wait till you are introduced. Children are great little sticklers for the proprieties, according to their code. Don't rush up to a child abruptly on sight, either to play with it, to caress or to examine it, and expect a gracious reception. No matter how much in a hurry you are, there is no time to be gained that way. Keep your distance and give him time to look you over and hear your voice, which should be kindly in tone. Tone and manner affect children more than words. You can say, "I love you" to a baby in a way that will nearly frighten him into fits; and you can say, "I hate you" with a voice and manner that will set him to cooing and smiling. Talk to his mother awhile without paying any notice to him, then give attention to his toys or games. People expect too much from a child's knowledge and rea-

soning powers. A little child does not think to himself, "This is a doctor or a nurse whose business it is to examine or take care of me. They will do me no harm but only good, and I must submit to anything, however startling or unpleasant, because the ultimate object is my benefit." This sounds absurd, yet it is no more so than some people, by their actions, seem to expect of a child —even of an infant. Why, there are plenty of timid and nervous adults who can scarcely bring themselves to allow an examination. But the child may observe and reason so far as to conclude that you are a friendly creature, and not over-violent and threatening in your ways; that his mother seems to have confidence in you, and that you seem to be interested in what interests him. By the way, the easiest way to seem interested is to be interested; and by the time your own sympathies are in full play and you are feeling the interest that you should in his case, ten to one he'll make the first advances, or come to you of his own accord. I say people expect too much from children. You will see a man training a colt which is afraid of a stump by the roadside. He will dismount and pat the animal to reassure him and lead him slowly up to the object of his dread and let him smell it, nose it all over and get accustomed to it, so he'll never be frightened at such a thing again. That same man will drag his own child, kicking and screaming, into a doctor's presence with many a harsh command to "be still," and expect the little one to be perfectly calm and philosophical about it. This comes of not understanding the child's understanding, and not feeling his feelings. And

why can not a man show at least as much tact in managing a child as he would in driving a horse? How often after examining a child have I advised the mother to bring it into the hospital, and heard her exclaim, "Oh, that would be awful!" "Oh, she'd never live away from me! Susie, do you want to come and stay in the hospital?" "Naw," bawls the child, and the mother says, "There, I told you she wouldn't." And the plan is vetoed.

With a little tact that child could have been brought into the hospital without knowing it was a hospital. And when she had visited the children's ward and seen the little patients happy and contented, she would have been quite willing to stay awhile and play with the toys and make acquaintance among the children. When dismissed after the necessary period of treatment, she would have gone home half reluctantly, and would have remembered her experience with none of that senseless dread which, in the minds of many, is attached to the very name hospital. She would have remembered it only as a haven of cheerfulness, cleanliness and kindness, where health and happiness were restored to her.

Another secret of success in dealing with children is **truthfulness.** It never pays to deceive a child. You may succeed once, but you will lose a confidence that is worth infinitely more to you than a momentary success that might have been obtained better by other means. Never tell a child that it is not going to hurt, when the next moment gives you the lie. Better tell him it will hurt a little, but not more than he can stand, and you may be surprised at the child's fortitude. I

have many times been astonished at the fortitude with which a child would bear severe pain, such as the sewing of a wound or the reduction of a fracture or dislocation, when an anesthetic was inexpedient or not at hand. Before either cocain or general anesthesia were discovered, children often bore operations of various kinds, even upon the eyes, as old surgeons yet living can testify, with the fortitude of little heroes.

Gentleness is ever requisite to success in handling children, and is ever due from man and woman to their weakness and helplessness; and yet it must often be combined with firmness. The greatest firmness can be applied gently. Use a hand of iron in a glove of velvet to handle children.

To this catalogue of virtues you must add endless **patience** and invincible **cheerfulness.** The sick child is often fretful and exacting, peevish and irritable, and your duties will seem too tedious for endurance. Besides patience pure and simple, you will find some relief in **studying the case.** You will watch the progress of the disease and its effects upon the disposition and the power of the child, and this makes the exasperation easier to bear. You may see a girl of ten or twelve years who, when well, had given up playing with dolls, now convalescent from a long illness, reduced to the mental caliber of her fifth or sixth year, and playing with her dolls and toy-books again. You may see a three or four-year-old, after bronchitis, obliged to learn again how to walk. This morning I visited a manly boy of ten, past the worst in typhoid complicated with pneumonia, who was crying lustily like a three-year-old for a piece of

candy. And you may sometimes see a child aged by sickness and suffering—aged not merely in appearance but through experience, seem in character older than its years. Or, in acute illness, membranous croup, for instance, after a day or two under the stress of a terrible experience, the child may manifest an intelligence away beyond that usual to him in health. Observing these things will interest you and, moreover, will enable you better to understand and care for your little charge.

The **patience** and **cheerfulness of children** under serious, long, and distressing diseases and injuries are often a cause of remark. This is in part due to the fact that they do not comprehend the gravity of the situation. It is greatly in their favor that they are neither haunted with memories of the past nor apprehensions for the future. The present is enough for the child. If he is fairly comfortable and entertained at the present moment, he is wasting no vitality brooding over the question why he came to be ill or injured, or what the outcome will be. He has no regrets and no responsibilities, and he gets along better than if he had.

One may hear a child announcing with a smile that to-morrow he's going to have his leg off and be one-legged like Johnny Jones. He does not realize the threatened loss nor dread it. And yet considerable judgment is necessary about allowing children to know beforehand about a proposed operation, for sometimes the imagination of the child, without comprehending what is intended, will color it with tenfold terrors and cause horrible suffering from dread.

Children should **not be allowed** to witness operations, nor to hear descriptions of crimes, violence and bloodshed. This is not merely because of the shock to their sensibilities, but because they are imitative creatures. They are as imitative as monkeys, and their propensities get ahead of their judgment. During the late war an instance occurred in the family of one of our neighbors. The children had overheard conversations and newspaper accounts concerning the horrors of the battle—the attack and the defence, the shooting, the hacking and hewing, the deaths and the wounds. The two little brothers went out to play as usual, and took with them a hatchet. They sat on a log, and one said: "Let's you and me play war." "All right," said his brother; "My first. Lay down your hand." The chubby hand was laid on the log. Whack! went the hatchet. Off went a finger. That ended the war. Lucky it was no worse.

I once knew of some boys performing a surgical operation upon a playmate after witnessing the same upon cattle. Such instances are not uncommon.

Another point in the management of sick children is the question of **holding** them in the arms or carrying them about. It may be well when a sickly babe takes an out-door airing, especially if the air is cold, for the nurse to carry it in her arms rather than in a perambulator. The warmth of her body will protect against cold. But one daily sees children, perhaps with fever, held upon the lap or huddled in the arms of mother or nurse for hours, yes, for days and nights together. This is

all wrong. The child would be much better off in a comfortable bed of the right temperature. There might be a little skirmish at the start of this arrangement, but after a short period of *ineffectual* objection the trouble would be over and child and nurse better off. Not that I think sick children should be expected to lie continually and quietly in bed. They find ease in turning about or in being occasionally taken in the arms, and in some low conditions it is advisable to encourage them to a change of position (though they are not as liable to hypostatic congestions or bed-sores as adults). Another abominable practice is that of keeping a sick child dressed or partly dressed with the ordinary day clothing, both day and night. The excuse is that they were afraid the child would take cold if changed. So the child is kept constrained in the same clothing, perhaps additionally tortured with an old crusty poultice, and because it is restless and fretful it is held on the lap and rocked or carried about. Probably that same child if given a bath and a soft clean night dress and put to bed would fall asleep at once. This reminds me that it is a good plan anyway, bath or no bath, to change the garment at a certain hour, for the night. The bath and the fresh night dress are often better than any sleeping potion.

Another objectionable habit of many mothers and nurses is that of tossing about or **dandling** the infant. He must be trotted on the knee or swung and swayed about in the arms in a way that makes the looker-on seasick; or shaken up and down in the air till one trembles for the orderly arrangement of his internal organs. They are fond of

first filling a baby full of milk, and then putting him through this churning process. It always reminds me of the Oriental custom of churning in goatskins; and I am not surprised at the usual copious regurgitation of buttermilk.

Well babies, many of them, seem to like it, at any rate some of them live through it. Mothers all like it. I have thought maybe this is the remnant of an instinct stronger in an arboreal state of existence when our ancestresses loved to swing and sway with their babies among the boughs. But it is certainly bad for sick children, particularly for those with stomach and diarrheal and brain diseases. How often have I seen vomiting induced by dandling a sick baby—even by rocking it in a rocking chair or in a cradle. Every time it was moved it would vomit, and yet they did not seem to learn by that to keep it quiet. They did not want to stop even long enough for the doctor to make his examination, but expected him to take his observations, as it were, "on the fly." As to the question whether babes ought ever to be rocked, I'm not going into it here. Most of us have lived through it. Whether our brains were addled thereby, or otherwise, who can say? But I would like to impress upon you at least never to rock a baby troubled with vomiting or loose bowels. And don't rock or trot it while the doctor is trying to examine it. This reminds me to say a word about **preparing** a child **for examination.** I wish you could each be a doctor for a day and make your rounds in homes or hospital, and among your other trials have to wait everywhere you went until you asked those in charge to prepare

the patient and then watch them awkwardly do it. There are other disadvantages besides the loss of time. A child does not usually like the process of dressing or undressing; and does not always like the process of examination; and when both these trials come in the same minute he raises a protest; and then he is not in the most favorable state to be examined. A tactful nurse avoids all this. She has the clothing all loosened or removed and the patient enveloped in a warm blanket or other loose wrap. This is easily shifted out of the way during the examination; while with it she deftly protects from cold the parts not being examined.

There are a great many more things that I might say "about children," well or sick, and the care of them. Some I have purposely omitted, others abbreviated, and others doubtless forgotten. But our allotted time draws to an end, and I must stop somewhere. Probably you thought I had forgotten that. But I am sure that if you only retain a portion of the instruction offered, adding it to the charming and wholesome neatness, the faithful obedience in following the doctor's orders, and the love for the work, that characterize every good nurse, you will succeed admirably in your chosen calling. I wish you abundant success.

APPENDIX.

Raw beef juice can be prepared as follows: A slice of beefsteak is cut into blocks the size of dice. These pieces are placed in a tin sauce pan and warmed for an instant by placing the sauce pan upon boiling water. As soon as the meat looks wet upon the surface it should be removed from the heat. If heated an instant too long it turns whitish upon the surface (like an egg in process of poaching) and is ruined for this purpose. When warmed until the juice starts it is placed in a meat press, or if this is not at hand in a jelly press with a screw top, and the juice pressed out to the last drop. If no press is to be had, a lesser quantity of juice may be obtained by placing the meat in a linen towel and wringing it. Another way is to slightly broil the steak—barely scorching it—before cutting into dice. Then press or squeeze out the juice.

Scraped beef is prepared by laying flat a slice of steak and scraping the surface with the edge or back of the knife blade. The pulp collects upon the blade and is scraped off into a saucer. The operation is continued till only the fibrous tissue of the beef remains. The pulp is eaten raw, or may be shaped into small cakes, dropped upon a very hot griddle and quickly turned.

Whey, prepared according to these directions, might more accurately be called de-albuminated milk, as the process of curdling by pepsin essence separates such of the albuminoids as are coagulable by acid, while the heating to the boiling point separates whatever remaining albumen is coagulable by heat. Whey so prepared contains nothing that can curdle in the stomach, and may be used in cases of extreme gastric irritability. If necessary, brandy can be added to the whey, and generally agrees better than "wine whey."

To make a pint of whey, take a quart of fresh milk and warm to blood heat; add a teaspoonful of essence of pepsin. In a few minutes the curd has formed, when it should be broken fine with a fork and the liquid poured off, straining it through cotton cloth recently boiled. Then place the liquid in a clean porcelain vessel and heat to the boiling point, without boiling it. Strain through a cloth as before, and you have pure whey. Cool it slowly and keep carefully covered on ice until wanted.

Peptonized milk is made as follows (Rotch): "In a clean glass jar containing 4 ounces of cold distilled or boiled water dissolve 1 gramme (15 grains) of bicarbonate of soda and 0.25 gramme (5 grains) of pancreatine (extractum pancreatis), to which add 12 ounces of whole milk. Set the jar in a vessel of water at a temperature of 41.6° C. (107° F.) for from seven to ten minutes. Cool immediately and keep on ice until used.

"To peptonize modified milk, an amount of the

powder should be used corresponding with the percentage of the proteids in the mixture, taking the standard of the whole milk to be represented by four per cent of the proteids."

Barley water should never be made in an iron utensil, but in enameled or porcelain ware, and great care used to avoid burning. Burning while cooking is easily avoided by placing the container in another vessel of boiling water. To a tablespoonful of fine pearl barley add a pint of water and parboil with constant stirring for a few minutes, to cleanse the grain. Pour off the water, replace with a pint and a half of water; boil gently for not less than one hour, and while hot strain through boiled cheese-cloth, two thicknesses. A better way is to first make barley meal by washing and drying barley and then grinding through a coffee-mill kept for the purpose. Barley water is a thin mucilaginous fluid. To make **barley jelly,** take 4 ounces of barley meal to a quart of water and boil down to a pint, straining as before. Keep on ice. When cool, it forms a jelly. When used, it is melted again and mixed with milk as directed.

To make lime water. Lime water deteriorates by keeping, and one often finds a worthless article in use. Fresh lime water may be had from the pharmacy, but this is not always at hand. To make lime water, take a piece of fresh unslaked lime the size of an orange and slake it by sprinkling

water upon it. In a few minutes, when it has done crumbling, put the lime into a gallon jar and fill up with water. Cork it tightly, shake it well and stand it aside for twenty-four hours. Then pour off the clear water, which is now ready for use, and keep it tightly corked.

Oat jelly is made by soaking 4 ounces of oatmeal in a quart of water, boiling down to a pint, and straining through boiled cheese-cloth, double thickness. Keep on ice.

Arrowroot water. Put two teaspoonfuls finest pulverized arrowroot in a pint of water. Let it simmer for ten minutes, stirring constantly and carefully avoid burning.

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